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FOREST FIRE

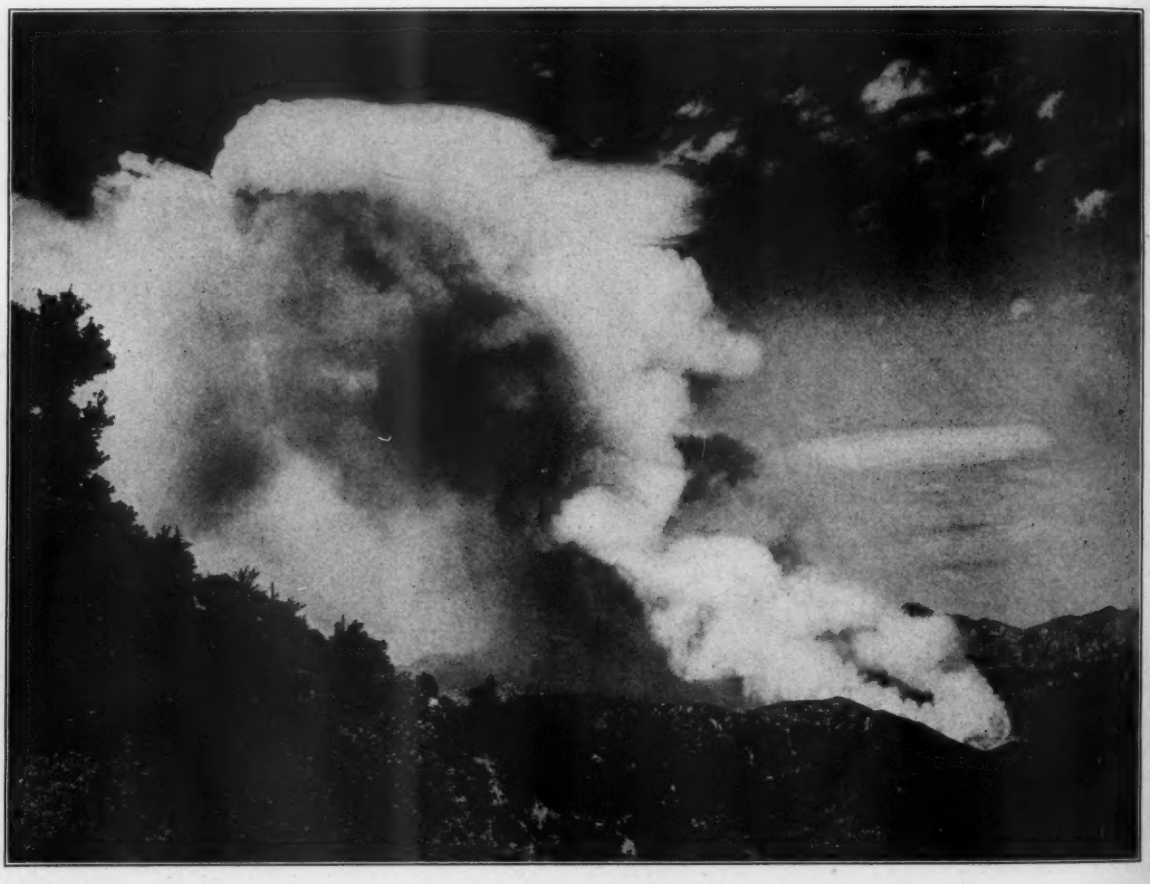
I saw this:—

It was the Inferno of Dante:
But ten times worse.
More horrible; more wildly beautiful.

There was a Valley, deep, rough and jagged.
On its sides, struggling for their places,
Were pine trees—ancient, gaunt and gray.

It climbed to their black boughs,
Even to the summits,
And there it feasted.

On the crest of the Valley, Man stood
Gazing down . . . terrified.
He could not move.
His eyes, bulged with fear, followed the dancing
flames upward



It was Night.

Above the Valley, like a fog on a day of damp,
There lingered a cloud—
Delicately pink, and changing with the minutes.
In the Valley, all was flame.
It lapped the scrubby grass, devoured the
scraggy bushes,
But coming to the pines, softly caressed them;
Until, in a moment of madness,
Until above the cloud of pink,
They were lost in blackness.

Once a lullaby, the murmur of the flames became
a cry—
Like the clarion notes of a trumpet triumphant.

The Valley was—the Inferno.
The Inferno was—the End.
I saw and heard all this.

—E. LIONEL FINCH.

AMERICAN FORESTRY

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FOREST FIRES—A NATIONAL PROBLEM

BY WALLACE HUTCHINSON

As national prosperity is ravaged at times by economic waste, so forests are ravaged by fire. The red plague of conflagration, which has been long present in our fair land, has left its sinister effects on every state and every community. But the day of reckoning is close at hand. America's vast natural forests, exploited with lavish indifference and left unprotected without thought of the morrow, are nearing a point of exhaustion which spells disaster if the rate of cutting and burning is not summarily checked. Particularly disquieting is the fact that there is a steadily increasing cost to practically every product into which wood enters, from the humblest cottage to the great industrial plants, and from plow handles to print paper. This burden is shared in common by the people of all America.

THE FOREST PRIMEVAL

The finest forest timber in the world was the heritage of the American people. On it the prosperity of the Nation has been built.

The virgin forest area of the United States, experts say, was not less than 822 million acres, bearing a stand of something like 5,200 billion feet of as fine timber as ever grew. Only two-fifths of this original supply remains, and our forest lands have been reduced nearly 50 per cent in acreage. But this is not all of the sad story.

Taking stock of our forest resources today, we find that 81 million acres—an area nearly as large as the combined states of Ohio, Indiana and Illinois, are an unproductive waste, which together with the lands partially stocked with young growth constitute an area of over 214 million acres of potential forest land that no longer bears useful timber. Why don't they? A large part of the answer is F-I-R-E.

A situation of this kind appeals to the imagination with peculiar force. It is easy to picture hypothetical happenings that might follow in the trail of the flames.

If the United States was a private corporation dealing in natural resources on a large scale, it would receive once a year a bill reading something like this:

The United States of America,		
TO VULCAN, GOD OF FIRE (Forest and Otherwise), Dr.		
Jan. 1 to Dec. 31	For 33,000 forest fires covering 12,000,000 acres	$20,000,000
	Received Payment,	
		V.

No business could stand such a yearly drain on its resources without facing financial ruin, and that is just what our own country is headed for, as far as forests and timber supply are concerned, unless our legislators and citizens wake up to the fact that the nation's fire problem is in urgent demand of immediate solution.

The Federal Government, in its National Forests at least, has faced the problem squarely and is in a fair way of solving it. The protection of 156 million acres of forest land, much of which is in mountainous and remote regions, is a Herculean job in itself, and no one knows this better than the United States Forest Service. Therefore, it has set about carefully and painstakingly to work out a protection system that will be, from the very ground up, as nearly "fireproof" as is possible to devise. Experience is an excellent teacher, and forest officers have had ample opportunity these last few years to learn many a hard-earned lesson in the fire game.

The workings of this fire-fighting organization, which is without doubt one of the most efficient in the world in the combating of forest fires, is worthy of note. The nucleus around which the fire force is organized is the permanent force of 2,000 administrative officers, supervisors, rangers, and forest guards on the National Forests. The more experienced of these men direct the fighting, furnish tools, subsistence and transportation to fire crews, pay off the laborers, and, in short, have general supervision over all forest protective measures within their local jurisdiction.

In all National Forests—and there are 147 of them scattered from Atlantic to Pacific and from Gulf to Bor-

HILLS CLOTHED WITH VERDURE, FAIR TO SEE

The virgin forest area of the United States was eight hundred and twenty-two million acres. Today there remains but 50 per cent of this total forest area. An ugly fact, but a fact nevertheless.

der, with two in Alaska and another in Porto Rico—an inventory of every possible source of fire danger is first made; then an inventory of the resources available to combat them. Preventive measures, such as the establishment of aerial and ground patrol, lookout stations, and public education in the right use of fire, together with such protective measures as cleared fire lanes, burning of dangerous slash, establishment of lines of communication, etc., are then put into effect.

The prime requisite in successful fire fighting, anywhere and everywhere, is an intimate knowledge of the lay of the land, an adequate detection and communication system, and arrangements perfected in advance for handling any fires that occur. The ranger and supervisory force of the National Forests furnish the first; airplanes, lookout stations, patrolmen, roads, trails and telephone lines the second; and the systematic and well laid fire plans of the Forest Service the third.

Fire seasons occur at different times of the year in the

FIGHTING THE RED ENEMY

The National Forests—first line of defense—the Ranger and his crew on the fire line.

various National Forests of the country, but no matter when the period of greatest hazard may be, preparation is made long in advance to combat the arch enemy of the forest. Lists of men, horses, automobiles, and supplies and equipment are worked up; aerial patrol is started; lookout stations are manned; extra patrolmen employed; central employment and distributing agencies established; and the co-operation of the public enlisted. Beyond this point, human ingenuity and effort count for little, and local weather and fire conditions play a large part in the final outcome of the season's effort.

A FIRE MAKING GOOD HEADWAY

The red plague of conflagration has left its sinister effect on every community.

The efficiency of any system or plan of work can be measured largely by the results secured. So it is with the Forest Service fire-fighting organization. Let the figures speak for themselves. In 1920 there was a total of 6,078 forest fires in the National Forests. Of these, 80 per cent were discovered and extinguished by forest officers before they burned over an area of 10 acres each. A total of 342,193 acres of timber and open land were burned, or .2 of 1 per cent of the area included within all the Forests. The damage reported amounted to $400,000, and approximately $1,000,000 was expended in extinguishing the fires.

The preservation of our forests means not only protection to the lumber and pulpwood industries, and to watersheds so vital to the power and water resources of the country, but it means the safeguarding of the very essential of happy home life and business prosperity of every citizen. Today wood is not nearly as plentiful as it was a decade ago, and should it become more scarce in time to come the result will be a readjustment of the present high economic standards of living. When we stop to think that 50 per cent of the remaining forests of the United States are in the three Pacific Coast States of Oregon, Washington and California, the need for adequate protection of these timber resources is plain to every one. It is, therefore, of interest to note the latest experiments in the protective service covering this par-

A SMOULDERING GROUND-FIRE

"A little fire is quickly trodden out,
Which, if suffered, rivers cannot quench."

ticular region—the airplane forest patrol.

This year the aerial fire patrol, maintained by the Air Service of the U. S. Army, in cooperation with the Forest Service, enters into its third engagement. During the season of 1920 airplane patrol was maintained over the National Forests and Parks of the Pacific Coast from southern California to northern Oregon. From six base stations airplanes made a total of 1,301 patrols, spending 3,996 hours in the air and covering the tremendous distance of 476,085 miles. Flying at an altitude of from 10,000 to 15,000 feet, the airplane observers discovered 1,632 forest fires, of which 741 were reported to ground stations by radio, and the remainder by parachute messages or on landing. The percentage of accuracy, on the basis of 100 per cent for fires reported within one-fourth mile of their exact location, was 80 per cent. Thirty-seven airplanes were used for patrol and the personnel of officers, pilots, observers and mechanics numbered 220.

Aerial patrol, although spectacular in its methods, falls short of solving the fire detection problem. Of the forest fires discovered by airplane observers last year on the National Forests of the Pacific Coast, only 26 were reported to officers of the individual Forests concerned before similar reports had been received from lookout stations, patrolmen or other ground sources. It is expected to better this record during the present season through improved radio and ground-line communication. But the main reason why airplane patrol fails in effectiveness is because it does not afford a means of continuous observation. Any given point or part of a forest, to be fully protected from fire hazard, must be under constant observation during the entire daylight period, which in summer time amounts to some 15 or 16 hours. Airplanes on patrol duty are able to make only two flights of from two to three hours each a day, going out over a regular

A REPRODUCTION AREA

If our idle forest lands could be put to work growing trees, and fire kept out, they would produce all the timber that the country needs.

route in the morning and returning in the afternoon. Since the machines travel at high rates of speed and cover great distances, the maximum time any part of a forest is under observation is roughly one-half hour during each flight, or a total of one hour per day. Therefore, for the remainder of the day there is no detection system in operation should a fire break out. The experiments made to date by the Forest Service indicate that aerial patrol will, probably, never supplant the ordinary means of fire detection now in common use. To the extent that it proves valuable it will serve as an adjunct, and under special conditions.

Let us now turn to a brief consideration of the forest fire losses of the whole United States, concerning which some interesting as well as startling statistics have recently been compiled. Even a cursory glance at the following figures will show how great is the need of adequate provisions for the safeguarding and renewal of our forests, and of what vital importance this problem is to the welfare of the nation.

During the past five years, or from 1916 to 1920, inclusive, the total loss from forest fires in 45 states, including National Forests, was more than $85,000,000. A stretch of country considerably greater than that covered by all the New England States, or the State of Utah in the West, was devastated by fire. To be exact, 56,488,000 acres were burned over. The total number of forest fires during the five-year period was 160,000. Minnesota, with total damage figures of $30,895,868, leads all States in monetary loss. This, however, was due largely to the catastrophe of 1918, where, in addition to growing timber destroyed and towns and settlers' homes burned, nearly a thousand persons lost their lives by fire or suffocation.

A study of the figures which shows the acreage burned over by States reveals some interesting facts. Here we find six states, which have been been more or less backward in forestry legislation, leading the list. According to the records, Louisiana, Florida, Georgia, Mississippi, Arkansas, and Alabama, in the order named, had a total of no less than 48,783 forest fires in five years; Georgia alone had over 20,000 fires. These burned over some 38,743,000 acres, or 56 per cent of the total fire-swept area of the United States. The damage wrought amounted to over 17¼ million dollars. Of these several States Louisiana alone has taken official cognizance of the forest fire evil and has provided for a fire protection organization. The work of this organization has thus far consisted largely in finding out the real extent of forest fire damage. This activity doubtless accounts for Louisiana leading all those States in the extent of its losses reported. There is food for much thought in these data, especially for the legislators, lumbermen, and citizens of all these southern States.

A BARREN, UNPRODUCTIVE WASTE

It is appalling to think that eighty-one million acres of our country—an area as large as the combined states of Ohio, Indiana and Illinois—are an unproductive waste such as this.

It is almost unbelievable that of the 160,000 forest fires that have occurred in this country since 1915, 80 per cent were caused by man, and were, therefore, preventable. Among the human agencies that were responsible for the greater number of these fires may be listed campers, railroads, brush burners, lumbermen, and in-

cendiaries. *Carelessness* was the cause of most of them, and this emphasizes all the more the need for widespread public education in the proper use of fire, especially when in the woods. This is a movement to which every man, woman and child in America should lend his best efforts and willing, whole-hearted cooperation, and it will take something more than passive cooperation at that.

The fire problem is one which also requires concerted action by the Federal and State governments to do the things which must be done by public agencies. Today, through cooperation with the Forest Service, 27 States are receiving Federal funds for the protection of their forest lands. Over 150 million acres of the principal timber regions of the country are thus being guarded against devastation by fire. The limitations governing Federal aid in fire protection under the so-called "Weeks Law," which was originally passed by Congress in 1911, are:

1. It is only extended to States that have provided by law for a system of fire protection.
2. It is limited to the watersheds of navigable streams.
3. The State must expend an amount equal to the Federal allotment for that State.
4. Fire protection by the State must not only include merchantable timber, but also cut-over land and young growth; in short, must cover all classes of forest land.

On this basis, there are still 15 States, with a total of 175,000,000 acres of timbered land, which have taken little or no action in forest fire prevention matters, and are, therefore, not eligible to receive Federal aid. These are Alabama, Arizona, Arkansas, Colorado, Delaware, Florida, Georgia, Indiana, Kentucky, Mississippi, Missouri, Illinois, Oklahoma, South Carolina, and Wyoming. Lack of public sentiment for organized control of forest fires is prevalent in many of these States; in others, fire prevention legislation has been pending for a number of years without favorable action. Probably nowhere in in the United States is education on the evils resulting from uncontrolled forest fires as badly needed as among the citizens of the South.

THE TRAGIC AFTERMATH—LOSS INCALCULABLE

During the past five years the total loss from forest fires in 45 states was more than $85,000,000, and an area of 56,488,000 acres was burned over.

But the South is not the only part of the country that should be awakened to the importance of this present-day problem. While there are now several States which are protecting a part of their forests equally well with the Forest Service, or even more efficiently, nevertheless,

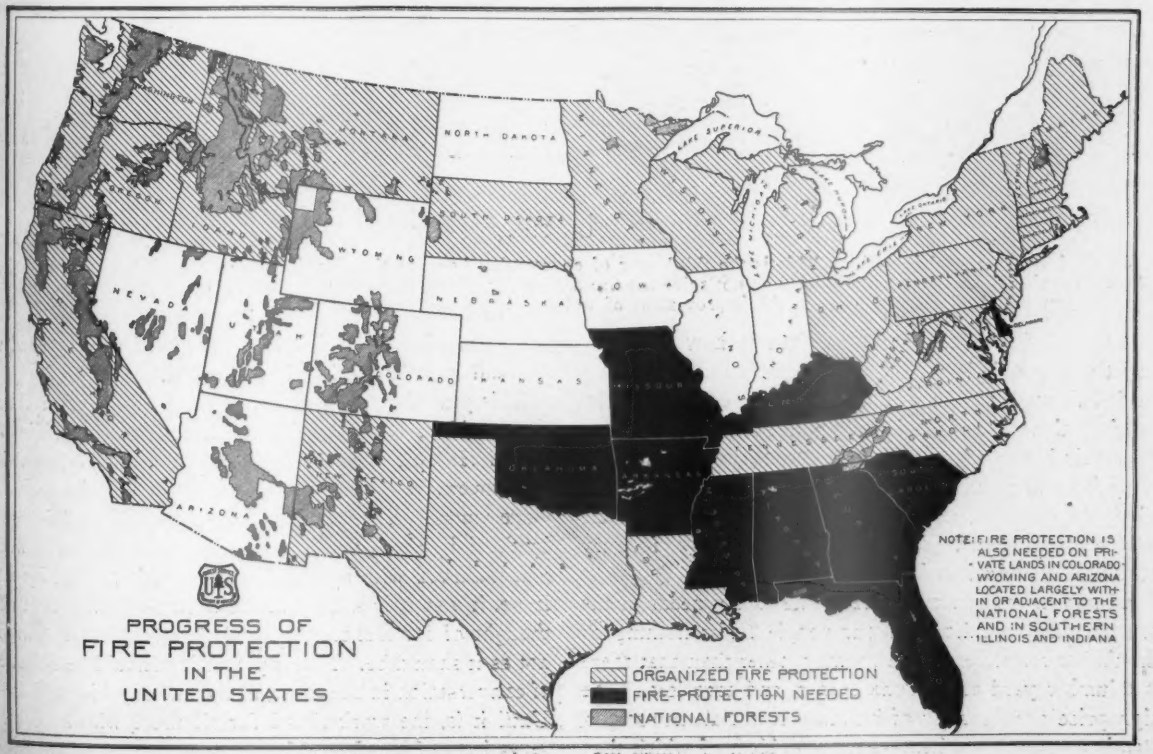
(Courtesy U. S. Air Service)

COOPERATION IN FIRE CONTROL FROM THE AIR

Flying at an altitude of from 10,000 to 15,000 feet, the airplane patrol on the Pacific Coast last year "spotted" 1632 forest fires and rendered invaluable assistance to the Forest Service.

there is hardly a State in the Union that can boast of having attained adequate protection standards, and many more are very far from it. Yet every State has some kind of forest fire laws among its statutes, and 33 of them have passed legislation calling for greater or less activities along forestry lines, but not necessarily fire protection. During the last year, however, the law makers in many States have awakened to the fact that fire and the forestry problem are national matters in which every commonwealth, regardless of whether it produces timber or not, is vitally interested.

Our forestry problem is national in scope because it has to do with a product of the land that is essential to all business development. It is out of the question to think of making all timbered lands over into Federal National Forests, because of the large holdings already in private ownership. On the other hand, we will fall far short of the mark if the matter of timber production is left en-



tirely in the hands of the lumbermen. People at large and the private owners of timberland must sit on the game and help the States and National government carry the burden.

There are a number of essential things to be done if this country is ever to have a standard policy of timber production. First, we should have a complete survey of our timber resources—a stock taking, if you please—so as to find out our forest assets and determine what land should be permanently retained for timber production. Second, the Government, States, and private owners, working in cooperation, must establish standard systems of fire protection and reforestation, since largely on these two prime factors will rest the success of the whole movement. Third, the States, with the aid of the Federal Government, must work out a more equitable system of forest land taxation than is now in effect. Fourth, the existing National Forests should be extended through purchase, land exchange, or Presidential proclamation to include large timbered areas now outside their boundaries. Fifth, the States must pass forestry laws to provide for carrying out their part of the whole economic plan. Sixth, all agencies must lend their best efforts toward public instruction in the forestry problems confronting the nation.

Education in forestry is one of the crying needs at the present time. Millions of our people know nothing of the timber resources of the country, other than that there is a lumber yard around the corner, and care less. The high price and scarcity of building material, newsprint, etc., is a mystery to them—a new problem of which they have not yet learned the solution. The fact that forests enter into the daily cost of living, and are part and parcel of the industrial prosperity of the nation, has never occurred to them. How to carry the message of forestry in an impressive way to such people is one of the big problems of the day.

New Jersey made a start along these lines not long ago by providing for the compulsory teaching of fire prevention in its public schools, so that every child, at least, will know something of the danger from fire and the care necessary in its use. Other States have been working along similar lines, and this year compulsory fire teaching laws were passed by California, West Virginia, and Rhode Island. The New York legislature also passed a similar bill, only to have it vetoed by the Governor. The outlook in many of the other States is not very promising, but when the public becomes sufficiently aroused to demand such legislation, it will get it.

(Courtesy U. S. Air Service)

THE EYES OF THE FOREST

The airplane fire patrol in action. This is the third year of cooperation between the Air Service of the U. S. Army and the Forest Service and while aerial patrol does not solve the fire detection problem, it is a powerful help and its effectiveness in this respect will be increased through the improvement of radio and ground line communication.

This year the proclamation of Forest Protection Week by President Harding, did much to awaken public interest. In 19 States, local proclamations were issued by the Governors in response to the President's appeal. A large amount of space was given the subject of forestry by the daily press, and in many cities and towns the week was observed with appropriate ceremonies. But, by and large, it was only a drop in the bucket—something to be thought of for a short time and then forgotten. This is not as it should be. Forest protection should be a matter of conversation in the office, at the club, and in the home. Until it is, the work ahead for all those who have conservation at heart looms large.

THE EXPLOITATION OF THE FOREST

America's vast forests, exploited with lavish indifference and left unprotected without thought of the morrow, are nearing a point of exhaustion which spells disaster.

It has been repeatedly said that the kernel of the whole forestry problem is fire protection. What use to talk about the conservative cutting of timber, or of reforestation, unless we first provide adequate preventive measures against fires? If our idle forest lands could be put to work growing trees, and fire kept out, they would produce all the timber that the country needs. Instead, we go merrily on our way, allowing the waste lands to be devastated, and using what little timber we have left faster than it is being replaced by new growth. In so doing, we are not only damaging the present, but literally burning up the future.

"What of it?" You may never know the answer, but your children and your children's children will some day most surely pay the price for the present extravagance and waste of natural resources by the American people.

(Photographs not otherwise credited through the courtesy of the U. S. Forest Service)

O MAN!

The tree had grown for a hundred years
  Shading the grateful soil
A man cut it down in half a day
  And groaned because of his toil.

The coal slept long in the earth's dark depths
  Covered with fern and flower
A man dug it out with the stroke of a pick
  And burned it all in an hour.

The oil lay hid in its deep down well
  Gift of the Pliocene past
A man used it up in the wink of an eye
  To run his auto fast!

O merciless man with the gifts of the gods—
  And this means you and me—
If you stay not your hand from its careless course
  What will the harvest be?

DON C. SEITZ

DR. SARGENT'S CONTRIBUTION TO FORESTRY IN AMERICA

BY HENRY S. GRAVES

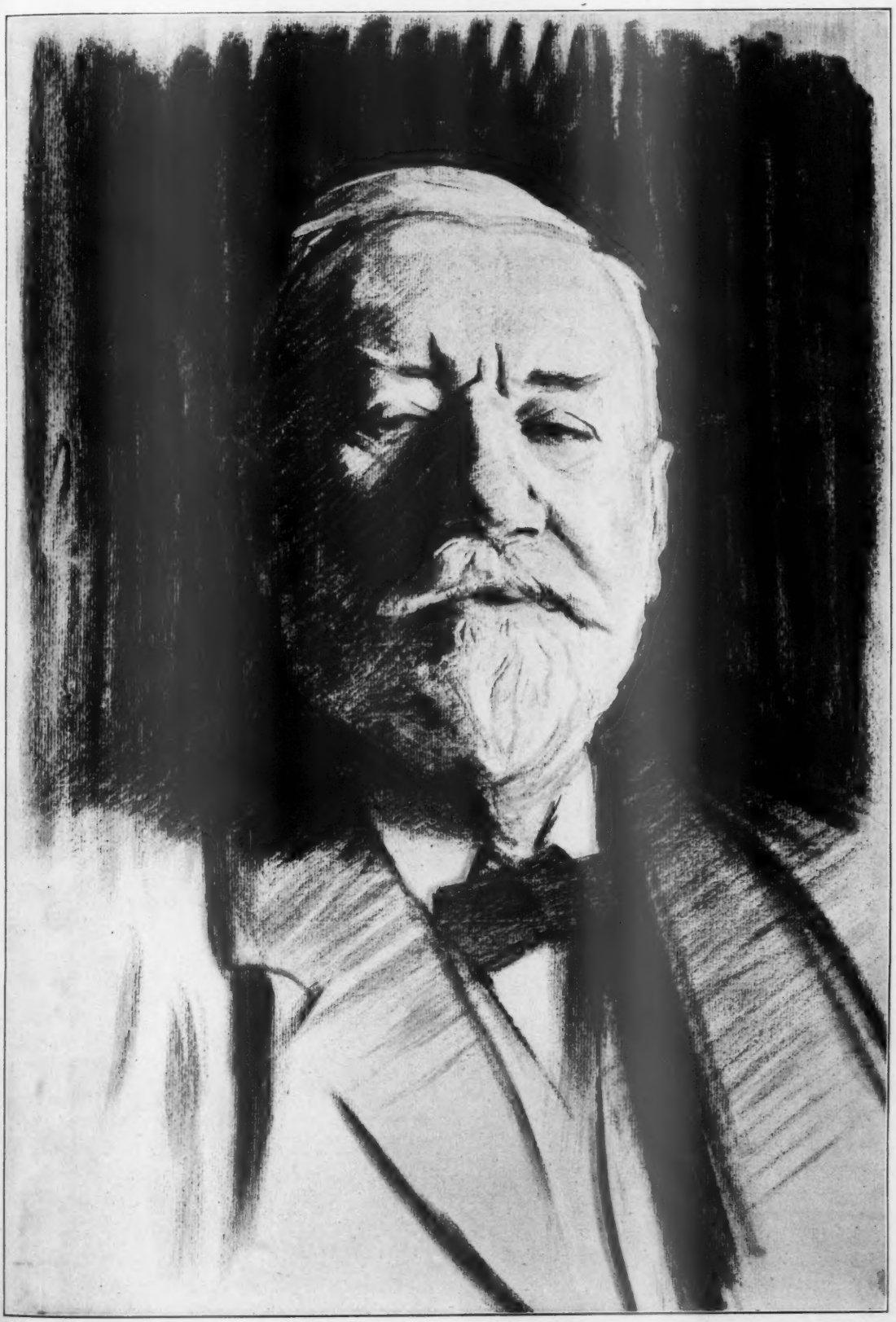
HISTORY has demonstrated in the United States, as in other countries, that the establishment of forestry is a process of many years of development. Much of what we have achieved is the result of foundations laid from thirty to forty years ago by men of vision and strength who instituted the first fight against the destruction of our forests. The history of forestry is not so long but that some of the early pioneers of the movement are still actively contributing to the work in a way that is possible only by those of wide knowledge and rich experience. Conspicuous among these leaders is Dr. Charles Sprague Sargent, who exerted a powerful influence on the initiation of the forestry movement in the early days, who was responsible for a number of epochal steps in forestry, and who is the foremost American scholar in forest botany and arboriculture and the builder of a great arboretum that is unmatched anywhere. His scientific contribution to forestry and his personal influence on the movement will be increasingly appreciated as the years go by.

Forestry had its real beginnings in the seventies. The progressive depletion of many of the more accessible sources of timber supply caused a wide discussion of forestry in the East. About the same time the rapid settlement of the prairies was taking place, and the homesteaders were finding themselves greatly embarrassed by the lack of lumber and other material needed on the farm, a situation due to the fact that the great forests of the Lake States had not yet been opened up and there were still lacking transportation facilities to distribute readily and cheaply such lumber as was obtainable. These conditions explain the agitation in forestry and especially for the planting of trees at that period. No less than sixteen states enacted legislation for the encouragement of tree planting about that time, and in 1873 Congress passed the so-called Timber Culture Act, whose purpose was to bring about the establishment of plantations of trees on the plains. One important educational influence was the action of the American Association for the Advancement of Science in 1873, which memorialized Congress and the State legislatures on the subject of forestry, and specifically recommended the appointment by Congress of a competent commission of inquiry. This action resulted in a great deal of discussion of the subject and was responsible for the federal appropriation that enabled Dr. F. B. Hough to make his special reports to the Commissioner of Agriculture from 1877 to 1882.

The first action of importance by the Federal Government, however, was the authorization of a special study of the forests of the country in connection with the tenth Census in 1880. This work was delegated to Dr. Sargent. The results of his study were presented in a monumental work for which an entire separate volume of the Census was devoted. There is in this work a comprehensive description of the forests of the country, a survey of the situation with reference to existing supplies of standing timber, the facts regarding the forest industries, a statement regarding the destruction of forests by fires, and a summary of the existing information concerning the character and quality of the different commercial woods. This was the first important effort to bring together in available form the facts in regard to our forests. It provided for the first time an economic background for the consideration of the needs of the country for forestry. For many years it furnished the chief source of data for educating the people of the country to the need of action. In fact, no attempt was made to supplement this work in any large way until 1908, when a large amount of information based upon existing conditions was assembled by the National Conservation Commission appointed by President Roosevelt. The influence of the work of Dr. Sargent through his report for the tenth Census was very far-reaching and greater than can be measured.

In connection with this work for the tenth Census Dr. Sargent brought together a noteworthy collection of specimens of the woods of the United States. This was made possible through the generosity of Mr. Morris K. Jesup of New York who provided the necessary funds. The specimens were in the form of sections of tree trunks of typical size, showing the character of the bark and with a portion of each section cut in a way to illustrate the grain of the wood. The collection is now in the Museum of Natural History of New York. So far as I know there is no other collection of wood specimens equal to it anywhere in the world.

One of the outstanding accomplishments in forestry has been the building up of the State Forest Preserve in New York. We have that splendid undertaking today because of the foresight of public spirited men nearly forty years ago. At that time the State owned in the Adirondacks and Catskills something over 700,000 acres of forest land. These State lands, which were entirely without protection, were the object of extensive stealing of timber, were in many cases being swept by forest fires, and were also subject to numerous fraudulent transactions through the misuse of the laws relating to tax redemptions and cancellations. It became generally known in 1883 that the Adirondack Railroad Company contemplated the extension of its lines into the heart of the wilderness in order to exploit the timber on its extensive holdings. This property comprised 500,000 acres and about twenty years before had been granted to the predecessors of the Adirondack Railroad Company for five cents an acre. The proposal to exploit this great tract and to bring the railroad into it, which would expose the whole region to damage by forest fires, caused



From a drawing by John S. Sargent

Dr. Charles Sprague Sargent

great public anxiety. A popular campaign was conducted under the leadership of the Chamber of Commerce of New York to secure State action to save the Adirondack forests. The State legislature had appointed a committee of three men to reach some conclusion in regard to the Adirondack problem, but little headway was made on account of the lack of expert counsel. Accordingly in 1884 a commission of experts was authorized by the legislature to study the situation and to make recommendations. Dr. Sargent was appointed chairman of this commission. His report submitted in the following year contained recommendations in regard to the establishment of a definite forest policy for the State. The bill accompanying the report was the basis for the law of 1885 which established a State Forest Preserve, authorized the appointment of a forest commission, and contained other features of State policy upon which the whole system of forestry in New York has been constructed.

The Arnold Arboretum at Harvard University was established in 1872. Dr. Sargent has been its director since that time. His position at the head of this institution afforded him an opportunity to take the lead in forestry in many ways that have counted large in influence during the whole period of its existence. Repeatedly he was called upon to render public service both in State and national matters. Among his early contributions were his reports in 1875 and 1878 to the Massachusetts State Board of Agriculture on the planting of trees, supplemented by additional information in subsequent years. One of the most important instruments of education in forestry used by him was Garden and Forest, a magazine published under his immediate direction, organized in 1887 and continued for ten years. This magazine was primarily designed to promote the interests of forestry and landscape gardening. On the side of forestry it contained a wealth of interesting material. A student of forest history can obtain in these ten volumes better than anywhere else a conception of the incidents of importance in the forest movement during that period. By articles and editorials the different public questions relating to forestry were discussed and a strong position taken by the editor in regard to public policy. As early as 1889 Garden and Forest urged the need of adopting a definite national forest policy, with special reference to the handling of forest lands on the public domain. Specifically it urged the withdrawal of the public forests from further disposal to private individuals, their temporary patrol by the Army against forest fires and depredations, and the appointment of a competent commission to prepare a plan for the administration of the public properties. One finds in the editorial columns discussions in regard to a national park policy, the service of forests in watershed protection, the problems of forestry in New York State and elsewhere, the need of courses in forestry in our educational institutions, and many other subjects which today also are being discussed in our forest periodicals.

Within the last two years there has been initiated a nation-wide campaign to save a remnant of the great Rodwood forests in California. An association has been organized under the name of "Save the Redwoods League." Its purpose is to secure funds to acquire from private owners small groves along the State highway that runs near the coast through the Redwood belt, and to establish a number of public parks which shall remain for all time in their natural state. It is interesting to note that in 1897 Dr. Sargent proposed in an editorial in Garden and Forest the raising of $500,000 for a similar purpose. In this appeal he said among other things:

"To those who have wandered among these mighty trees, built up by the slow growth of centuries, and felt the inspiration of their solemn beauty, the destruction of the Redwood forests seems to be a sacrilege which should not have been allowed, and certainly, if some small part of it is not preserved, a great wrong will be done to the world, which will lose, with the passing of the Redwoods, one of its fairest possessions."

The first step in a National Forest policy was taken in 1891. It will be recalled that certain of the old laws for the disposal of public lands had become obsolete or subject to abuse. An effort was made to revise the public land laws by the Act of March 3, 1891. In this Act the authority for the sale of public lands was abrogated, the troublesome Preemption and Timber Culture Acts were repealed, the Desert Land and Homestead Acts were modified, and various other changes made in the land system. The friends of forestry were able to secure the insertion in the new law of a clause granting to the President authority to set aside by proclamation portions of the public lands as forest reservations. It was this authority which laid the foundation for the present system of National Forests. The establishment of reservations proceeded, however, slowly and under many difficulties, largely due to the lack of the proper machinery for administering the forests and for making the necessary plans to extend the system. Dr. B. E. Fernow, Chief of the Division of Forestry in the Department of Agriculture, was taking an active leadership in bringing about a more efficient plan for administering the public forest problem. But he was handicapped because the jurisdiction over the forests rested with the Interior Department while he was attached to the Department of Agriculture. Sufficient interest in the question of public forests was aroused to induce Congress in 1896 to authorize the National Academy of Sciences to make an investigation and report "on the inauguration of a national forestry policy for the forested lands of the United States." A commission of seven men was appointed by the Academy with Dr. Sargent as chairman. An appropriation of $25,000 was made by Congress which enabled the commission to visit the west during the summer of 1896 and to obtain a first hand view of the public forest problem. As a result of its report and in response to Dr. Sargent's recommendations, President Cleveland set aside new forest reservations

aggregating in area more than twenty-one million acres.

This action caused a storm of protest from the West and precipitated a controversy in Congress that put to test the sentiment of the country regarding the conservation of our public forests. This is not the place to discuss the many interesting incidents of that controversy or the excellent work of the different persons responsible for bringing about a settlement. Dr. Sargent himself played a prominent part in sustaining the policy of additional forest reserves. The proclamation setting aside the reserves was issued by President Cleveland just before the completion of his term of office. The pressure upon Mr. McKinley, the new President, to annul the action of his predecessor was very great. Shortly after President McKinley's inauguration the Commission of the National Academy of Sciences called upon him to discuss the situation, and afterwards Dr. Sargent himself had a long private interview with the Prisident, with the result that the latter decided to take no action in the matter but to let the reserves stand. This was a critical point in the history of forestry, for at these conferences Mr. McKinley frankly stated that he had intended to return the reserves to public domain.

The controversy over the forest reserves set aside by President Cleveland resulted in the enactment of the Act of June 4, 1897, which provided for the administration and the uses of the public reserves. Thus was laid the real foundation for the system of National Forests which now aggregate more than one hundred and fifty million acres.

Dr. Sargent was also a prominent advocate of National Parks. His first proposal in regard to National Parks was in connection with the region included in the Glacier National Park. In 1882 and 1883 he had charge of the forest work of the Northern Trans-Continental Survey which was organized by Mr. Villard, President of the Northern Pacific Railroad, for the purpose of acquiring information about the resources tributary to the railroad. The most important expedition was that in 1883 when Dr. Sargent was associated with Prof. Pompelly in a reconnaissance of Northern Montana. The glaciers were discovered at that time. After Dr. Sargent returned to the East he wrote an article in The Nation advocating that the glacier country should be made into a National Park because of its scenic grandeur. In the reports of the Forest Commission of the National Academy of Sciences, already referred to, recommendations were made for the establishment of two National Parks, one to include Mt. Rainier in the State of Washington, and the other the Grand Canyon of Arizona. Dr. Sargent's views regarding parks were further expressed in different issues of Garden and Forest. He was an ardent advocate of National Parks, but believed in their establishment only where there were unusual scenic features.

Since that time Dr. Sargent has devoted his efforts chiefly to his scientific work in the study of trees and other woody plants. His research has added greatly to the world's knowledge of forest botany. His most important published work, The Silva of North America, will always remain one of the great classics in botanical literature. His Manual of the Trees of North America is the handbook of every student of American forests, and his other publications, constituting a long list based upon studies made throughout the world, enrich our knowledge of trees.

Dr. Sargent has already erected a great monument to his scientific work in building up the Arnold Arboretum. It was the original purpose to have at the Arboretum specimens of every tree and shrub capable of growing in the climate of eastern Massachusetts. During nearly fifty years of careful experiment Dr. Sargent has already gone far in carrying out this plan. Upon the two hundred and forty acres at his disposal, he has planted thousands of specimens of trees and shrubs both of native and foreign species. The student can find at the Arnold Arboretum one of the best special libraries on forest botany in existence, an herbarium equally rich, and a collection of living specimens of the trees and shrubs that shows their adaptibility to the local climate and their natural habits of life and growth. Students come to the Arboretum from many parts of the world. In many cases they find the trees of their own country brought together in a way more advantageous for study than at home. As a piece of scientific work in one branch of forestry the Arnold Arboretum stands as the most thorough and most nearly complete of any that has been undertaken in the United States. It is of immeasurable importance in laying a sound scientific foundation for American forestry.

R. G. MERRITT, a technical forester for ten years associated with the United States Forest Service and more recently assistant secretary of the North Carolina Pine Association, has been appointed an assistant in the Natural Resources Production Department of the Chamber of Commerce of the United States, with headquarters in Washington, D. C. Mr. Merritt's activities with the Chamber have to do directly with the work of the National Forestry Policy Committee. His work with the Forest Service took him into eight states in different sections of the country, and this wide experience, together with his training in lumber production and lumber association work, eminently fit Mr. Merritt for his present duties. He is a member of the American Forestry Association and a senior member of the Society of American Foresters.

WHAT IS FORESTRY ALL ABOUT?

BY THE OBSERVANT STENOGRAPHER

AS an innocent bystander I'm curious to know what all this forestry talk is about. Am I going to get hurt, and if so how and why? Must I take steps to protect myself, or will I be saved by grace of the national forest policy I hear talked about so much, with so little agreement as to what it should be.

Why is forestry anything to me anyway? As a citizeness with a vote, I try to be interested in good government and public welfare, but I live in an apartment house in concrete-stone-brick and steel-ribbed New York, where wood is apparently not needed nor used. Yet I'm told that millions and millions of feet of lumber are used right here in the big city and that wood is indispensable to our civilization, with no adequate future supply in sight. I've usually sat in wooden chairs and prefer wooden tables to the marble slabs at Childs, but why should I have to go out and rustle lumber or grow a tree to get them any more than I have to raise a sheep or plant an acre of cotton to get a new suit?

In the office where my working hours are spent, the foresters and lumbermen who frequent it are continually talking about the timber supply and saving the forests. At times they get real excited and seem to be trying to save the country from something, and when it comes to that I think we all ought to help. They talk about a Snell Bill and a Capper Bill, but they don't mean much to me, except numerous trips to Washington for somebody—and I've never even been there—and hearings and conferences and a general haze. There are a lot of other things which seem much more pressing and important to me, such as helping the poor babies on the East Side, or doing something with or for the undigested foreigners to make them good Americans instead of half-baked Bolsheviki who won't even try to learn our language, but come over and board with us, then try to wreck the kitchen.

Of course, along with other things, we must do something to save the forests. Why, Aunt Jane has the most marvelous picture of a big tree in her front room. I'm sure it must be a redwood, because that's the only big tree I've ever heard of. And everybody says we oughtn't to cut any timber because if we do the whole country will look as flat and treeless as Broadway. A very practical sort of man, I think he owns a mill, asked me what we would do for lumber if we didn't cut down any more trees, when I told him about the picture and made the remark that "We must do something to save the forests," but I didn't even answer him, because he's probably one of those people who like to pick an argument.

With all this in mind, and thinking maybe I'm behind the times, I sometimes ask my friends, or people I meet in Jersey—which you know is one of the places where New York sleeps—what they think of the Snell Bill, and if they agree that a yield tax instead of the general property tax would be better for the forests. Well, you should see them look at me. They don't say I should be committed to Mattewan, but I know they think it.

Then when I tell them we need a forest policy to provide wood for our children and everybody's children for generations hence, with some plan of paying for it so it won't cost anything, they ask what for will we need this wood, and isn't Jersey just covered with trees? Why on that picnic in the Jones' flivver Labor Day we had lunch under a clump of the finest scrub pine you ever saw, with lots of limbs down to just over our heads, so we didn't get wet in the shower and everything, and last summer, coming back from the shore one night we saw a beautiful fire running through the woods along the railroad. We should worry but its about father's income tax, and how to make last year's hat finish out the season.

So I wonder where is all the public sentiment the talk in the office made me expect to find. You would think from some of the remarks that forestry was the main thing talked about in the subway and on the Avenue, but I seem to have missed it. If people go home nights full of apprehension as to where their next board or spruce newspaper is coming from, they hide it mighty well. It certainly shows the wonderful control the American people have over themselves.

If it is all so important, one would think that each forestry enthusiast would tell his neighbors about it, and they would tell their neighbors, and soon everybody would be thinking and talking about the need of forest conservation and perhaps do something about it. This is what they should do if the subject is so big and urgent, and it must be vital to the country or to some one, and perhaps to me, or the handful of good men and and true would not be trying so hard to get a national awakening.

I've watched, too, in the papers and magazines for articles about it, and from the occasional things I've seen, the conclusion is that the lumber barons (in bold faced type with a spiked tail) are making a wanton, wilful waste of our beautiful forests, and for no purpose other than to see how much damage they can do while working for selfish, greedy gain. One would conclude from cartoons I've seen that you could always tell a lumberman by his loud checkered suit, big black cigar, and nine carat diamond stick pin, like they tell me barkeeps used to wear; yet the lumbermen I see in the office don't look like that, and from what I hear them say they are cutting lumber because people want to buy it (sometimes) to build homes with, and they are quite as anxious to make their timber go as far and last as long as those who do not own it. And I know, too, they have their troubles.

Since I'm trying to find out why I, as a personal matter, should get excited about a forest policy for U. S. A., I've also asked a lot of questions of the foresters who help

(*Continued on page 716*)

HEDGES OUT OF THE ORDINARY

BY LEWIS EDWIN THEISS

AT first glance there would seem to be very little connection between thrift and hedges, but a closer examination shows that our hedges may be the very essence of thrift. It depends entirely upon what they are made of. In any case, a hedge has to be cared for. A productive hedge will pay its own way, and perhaps net the owner a profit. An unproductive hedge is a liability pure and simple. The question for the householder to decide is whether he will have at least a portion of his hedge bringing in value, or whether he will have all of his hedge unproductive.

Commonly we have not thought of our hedges as revenue producers. But why should they not be? A productive hedge may be as beautiful as one that is purely ornamental, thus satisfying the esthetic instincts of the owner. The chances are that it will be more attractive than the merely ornamental hedge, because of the beauty of flower and fruit. And certainly there should be no comparison between the pleasure afforded by an unproductive hedge and one from which, year after year, the owner gathers products that have a tangible value in dollars and cents.

There is, however, a limit to the desirability of such a hedge. For planting along a highway a productive hedge would doubtless be undesirable. It would be an invitation to spoliation. The hedge would be damaged by thieves, and consequently the owner of the hedge would be greatly annoyed. But for planting along a property division line, or for a hedge wholly within one's own property, or for mass plantings within the home plot, productive plants of various sorts may well be selected in preference to the usual ornamental hedge plants.

The privet and the barberry are probably the two most used hedge plants. Is the privet any more beautiful than the filbert, or the barberry lovelier than the common currant? Both of these productive plants make very attractive hedges.

Some years ago the writer dug up a currant bush that stood in his garden, as the space it occupied was needed for vegetables. The bush was utilized as material for a hedge to conceal a wood-pile. The plant was divided into a dozen or so pieces, which were planted at five foot intervals. Decaying chip-dirt from the wood-pile was thrown around them, and usually the bushes get a dose of lime-sulphur when the orchard is being sprayed. Otherwise they have had very little attention.

Fortunately the currant is one of the hardiest of plants, and even with no more care than these bushes have had, they thrive and produce well. The largest bushes yield five or six quarts each of fine currants annually, and the total crop from the little hedge last

HANDSOME LANDSCAPE EFFECT OF THE FILBERT HEDGE

This hedge lends itself splendidly to the use of the landscape artist in planning large grounds, is excellent along a drive or as a dividing line in sections of a garden. The European variety produces a splendid nut, and the harvest from such a hedge is a time of pleasure and profit to the owner.

A COMBINATION HEDGE TO SCREEN THE VEGETABLE GARDEN

Can you think of anything that would make a more effective screen than this hedge of peaches makes? Or a hedge more ornamental—and profitable—than this one will be when hung with ripe peaches?

spring totaled two and a half bushels. There is no difficulty in disposing of the surplus. In 1920 we sold nearly ten dollar's worth of currants.

Probably there is no plant that the home owner can raise more easily than the currant. The bushes can be propagated by cuttings, root division, and layering. Layering is the bending down of a pliant branch until it touches the earth. It should be pegged down at a node or joint, and earth should be heaped over the joint. Roots will shortly grow where the plant is covered, especially if a slight notch is made in the branch near the node and between it and the root. When the new plant is well established, it can be severed from the main bush. By layering, several plants can be propagated from one bush at the same time. Thus by the following spring the propagator should have a number of plants for setting out.

Root division is merely the severing of the roots into a number of pieces, each with at least one stem. A large bush can readily be divided into a considerable number of smaller plants.

Hardwood cuttings are merely pieces of the plant cut when dormant. All currants need to be pruned, and cuttings can be taken when the regular pruning is done. These should be at least six inches long and may profitably be longer. They should have about three buds. The cuttings should be kept cool and moist until spring. Wrapped in moist moss and put in a cool cellar, they will keep perfectly until planting time in spring. Then they should be planted in the garden with the upper bud above ground, and be well cultivated. Roots will start, tops will grow, and shortly one will have thrifty little bushes that will be suitable for setting out in a year or two.

Given one plant, it is a very simple matter for the gardener to propagate as many new plants as he wishes and to have lots of pleasure in doing it. Thus, if one has it in mind to plant a currant hedge, one need not worry about the cost—unless it is necessary to have all the plants immediately. Select one each of the varieties desired, plant them in the garden, feed and cultivate them well, and propagate by layering and cuttings.

That is the way the writer is getting the bushes for a filbert hedge. Good filbert bushes of the European varieties, which are far the most desirable, cost perhaps one to three dollars each. A hedge of these bushes would be quite expensive if one were to buy all the bushes needed. Our proposed hedge will require scores of plants. We bought only two bushes, one each of two varieties. These are in a nursery row in the garden, where, by the methods already mentioned, we intend to produce as many plants as we need.

The European filbert bears a larger, better flavored nut than the native American filbert or hazelnut. Commercial nurserymen estimate that a mature filbert bush under proper cultivation will produce annually twenty

pounds of nuts. The bushes can be spaced five feet or so apart for hedge purposes. Even if this close planting cut the estimated production in half, no great number of bushes would be required to produce as many filberts as one family could possibly eat.

The filbert is one of our handsomest plants. The leaf is beautifully moulded, while the graceful catkins and rosette-like involucres that contain the nuts make the bush altogether artistic and desirable. The plant can be trained to grow like a little tree, but for hedge purposes it is better to make it grow bushy. It can be kept low by pruning, and pruning encourages the formation of fruit spurs. The native and the European varieties should never be planted together. The native plants sometimes suffer slightly from a disease that shortly kills the foreign varieties if it attacks them. Hence it is advisable never to plant them together.

The list of unusual hedge material by no means ends with the plants named. The gooseberry, for those who like that fruit, is every whit as desirable for hedges as currants are. Like the barberry, the gooseberry is armed with thorns, that help to repel marauders. The fruits are highly artistic, and even in winter the bare bushes are attractive. Gooseberries can be propagated like currants. For mass plantings in odd corners any one of these three plants is entirely suitable.

A division line hedge of blackberries will prove to be a joyful surprise to those who plant one. Set rather closely, kept within bounds by pruning, and fastened to a trellis of parallel wires, the blackberry forms a hedge that is truly a thing of beauty and a joy forever. It is doubtful if nature has provided a plant that can give man more real enjoyment than the blackberry. In spring, when the buds are swelling, the air is heavy with a wonderful perfume that increases as the blooms open. Unless it be the perfume of the wild grape, there is hardly an odor in nature so alluring. The blossoms themselves are a showy sight. Then come the tiny, green berries that gradually expand, turn red, and finally become a shiny black. The beauty of the blackberry does not end with the maturing of the fruit. In fall the leaves turn such a wonderful bronze red that a blackberry branch is a thing of rare beauty. It can scarcely be equalled as a background for cut flowers.

Dwarf fruit trees are also available for use in hedge making. Perhaps the pear is as desirable for this pur-

THE BEGINNINGS OF A FINE FRUIT HEDGE

Showing clearly the method used in training the young fruit trees. These are young dwarf apples being trained into a hedge The pliant young shoots will be fastened to the espalier wall so as to force them to grow in a vertical plane.

THE FILBERT HEDGE

Proving the contention that a productive hedge may be as beautiful as one that is purely ornamental. The decorative value of this handsome planting goes without saying.

pose as any fruit. Spaced at intervals of three feet, the little trees will grow into a compact hedge that will be beautiful at all seasons. Nothing in nature is lovelier than the creamy white blooms and olive green leaf clusters in early spring. The growing fruit is ever attractive, and the mature fruit is a joy to see.

Such a hedge can well contain pears of different varieties, that will mature at different times. The Clapp's Favorite and the Bartlett, that mature early, are of highest quality. The Sheldon pear is wonderfully attractive and also of fine flavor. The Keiffer should surely be represented, both because its fruit keeps until well into

SHOWING THE ADAPTABILITY OF THE PEAR TO HEDGE USE

This is an excellent illustration of the way fruit trees may be trained to grow in a vertical plane—a dwarf pear trained up on an espalier wall.

THE FRUIT OF THE EFFORT

This is a section of a pear hedge which proves the wisdom of training fruit trees to such use. It is at once beautiful and profitable—and the luscious fruit speaks for itself.

the winter and for the exquisite beauty of its fall foliage. By judicious pruning and training, such a hedge can be made to grow mainly in a given plane, like a tree that is grown with its limbs flat against a building. Thus such a hedge need not necessarily occupy nearly as much space as one would expect it to occupy.

Few people, probably, would care for so many quinces as even a little hedge would yield. Such persons might prefer a hedge of mixed dwarf fruit trees. But there are certain difficulties in making such a mixed planting wholly successful. Unless the various plants grow to about equal size, the hedge will have a ragged, uneven appearance that may be displeasing. Again, the plants in such a hedge should be such as require similar culture. Undoubtedly it would ordinarily be advisable to make such a hedge of one species.

Where space is not at a premium and productiveness is no inducement, there are unusual kinds of ornamental hedges that one can plant. We ourselves have just completed the planting of such a hedge along one of our fields that borders the public highway. This hedge is made wholly of spireas, with ninebarks and hardhacks set alternately. One blooms early, the other late. One makes a rounded, graceful mass of green, with drooping sprays of white flowers. The other is a rather stiff, up-standing plant, with spikes of pinkish blooms.

A floral hedge with an even greater variety of plants would be desirable. By planting bushes that bloom in succession, one could fashion a hedge that would be in blossom for weeks. *Forsythia suspensa,* the corchorus, the lilacs, the spireas, the Deutzias, and similar bushes lend themselves well to this sort of planting. If one prefers, a hedge can be made of a single variety. Probably it would be difficult to find anything lovelier than a hedge of *forsythia suspensa* would be, with its pendant branches laden with golden flowers.

The fact is that almost any hardy plant of appropriate size can be used for hedge making. In planting, as in other lines of activity, we Americans have gotten into more or less of a rut. We plant privet hedges because our neighbors do. It seems the accepted thing. But when we unexpectedly run into something original, that is as beautiful as it is unusual, we are almost shocked to find that the thing can be so lovely. The gardening of the future will more and more tend to free us from the shackles of convention. And we shall get more satisfaction from our plantings, whether they be of flowers or hedges, when we plant to express our own natures, than we get when we merely follow the beaten track. Some of us may prefer the privet to all other plants. For such a person the privet is the thing above all else. But some of us may really prefer other plants and yet not have considered the possibility of using them in such an uncommon way. And probably few of us have ever really regarded the hedge from the view-point of thrift. It is worth considering.

WHAT COULD BE MORE BEAUTIFUL THAN THIS BLACKBERRY HEDGE?

Its many spring blooms will be succeeded in summer by shining black berries, while the bronze red autumn foliage is one of the most artistic of all fall leaf displays.

AMERICAN FORESTRY GUIDES DEPARTMENT

SOLAN L. PARKES, EDITOR

THIS DEPARTMENT IS CONDUCTED ESPECIALLY TO INSTRUCT THE YOUTH OF AMERICA TO AID IN CONSERVING AND PRESERVING THE FORESTS, TREE, PLANT, BIRD AND HARMLESS ANIMAL LIFE.

THE American Forestry Guides is now an organization all ready, to organize councils and posts as well as to enroll individual members. This organization was created at the request of the many readers of the Forestry Guide department in the American Forestry Magazine. Great pains have been taken in the preparation of a program that would be attractive, instructive and helpful to lovers of the outdoor life. Immediately after the Forestry Guides department was established in the American Forestry Magazine it became evident from letters received from all parts of the country from the friends of forestry that an organization should be formed with its purposes based on the declaration of principles, as appears elsewhere in this department. Prominent educators, laymen, boys, girls, young men and young women in many parts of the United States were communicated with and responding, urged that an organization be created. Guiding ourselves by the suggestions offered, a group has for months been working in the preparation of a program that will promote health and progress and create sentiment for the conservation and preservation of our forests, and the life therein as well as the life in field and stream. It will also encourage clean sport, hiking and camping, will teach to do by doing, have as its motto "Service to God, to Country, to Fellowman."

As stated, we are ready—and will now say, quoting Postmaster General Hays in his recent message, "Let's go."

Let's go and organize Councils to supervise the Posts in specified territory; organize Posts where no councils exist; enroll individual members where no Posts exist. All pull together and "Let's go"—save the forests of the Nation as well as our tree, plant, bird and harmless wild life, with the realization that our youth and posterity will enjoy and be benefited.

Charles A. Snyder, President American Forestry Guides

Council organizations are composed of fifty or more persons who organize themselves into a body to have jurisdiction over the Posts in a fixed territory—i. e. city or county boundary line, to be determined, and to provide executive leadership.

Posts consist of groups numbering from ten to forty-eight members under an adult leader with an assistant of not less than 17 years of age for every sixteen members in the post. A full post will have one adult and three assistants.

GREETING FROM CHARLES A. SNYDER

In assuming the position as president of the American Forestry Guides, I wish, first of all, to send greetings to the numerous Guides and those under whose directions they have been carrying on their work with such notable success. The service you are performing is one of true patriotism, and it will be a cause for self-gratification, if I shall be able to assist in advancing the worthy purpose of the organization.

At the same time, I invite the co-operation of each and every fellow-citizen who realizes the importance of reforesting the waste areas of our country and of conserving the few existing forests. President Harding's showing, in his recent proclamation, of the devastation caused by forest fires, should set people to thinking who perhaps never before paid any attention to this matter. And by encouraging and supporting the Forestry Guides, they can be made an efficient national agency for just that purpose.

The movement looking towards enlarging this organization is a constructive, patriotic movement from both an economic and a social point of view. As our population increases, the cities and towns will increase in size and in numbers. If these are surrounded by arid areas, there is little hope for a wholesome national life. I believe in the idea of giving people a sense of the beauty of this world and then making them fit to live in it. This two-fold project will be constantly fostered by the teaching and practice of our Forestry Guides in preserving the Forests of our country and the wild life and flora therein. I know the founders of the organization had a somewhat similar idea in mind when they designed it "to conserve and preserve the forest and the life therein, with the youth of the country, and the youth with the forest."

On behalf of the organization of American Forestry Guides, I invite examination and co-operation by the people of the United States. Its work can be developed along with the public school education, and will give an impetus to that education. Give the youth of the land an interest and part in conserving the forests, that the two may be said to grow up together, and when the youth become the citizens they will appreciate the forests and know how to care for them. I feel proud in having been chosen as your leader. Let us make our country the best country, our people the best people. Let us learn to do by doing and ever remember that we owe service to God, to country, to fellowman.—CHARLES A. SNYDER.

Posts are subdivided into details of eight, making six details to a post.

Posts are to be named in honor of some great American citizen (Roosevelt, Franklin, etc.) The details are to be known by number; (Detail No. 1, 2, 3, etc.)

In working out the organization plans we have not lost sight of the youth in the rural districts. We are more than anxious that the young people of the United States be enrolled and become one of our family of Forestry Guides. Write us. Your country needs you in this conservation work. We know you want to help.

We ask the Outdoor Organizations of the country to help make our program available to the youth of the Nation.

Conservationists and Foresters; will you wake up? will you join us? The youth of America is more than anxious to help. All that is needed is guidance and leadership.

"LET'S GO"

We have searched far and wide for an aggressive, fearless, man for president; one who places cause before self, and appreciates the fact that our greatest asset is our youth, our greatest need conservation, that success depends on happiness, that if one would be happy, one must be active.

We found the man. We can trust his leadership. Read what he has to say.

"Let's go" while the legislative bodies are legislating. "Let's go" plant trees, stop forest fires, conserve bird and harmless wild life and the youth by bringing them close to nature and nature's God.

Slogan "America First."

We were very fortunate in having a wireless communication expert join our Forestry Guide family. He will tell us how to build, operate and care for wireless outfits. His belief is that wireless will become the communication method.

We have many other features in our program that will interest you.

What do you think of Mounted Posts; horsemanship taught by competent leaders?

And best of all we allow you self definition as to age. Boys or girls between the ages of 9 and 14 can organize posts under leadership of their own sex and young men or young girls can organize posts under the leadership of their sex.

For full particulars write to American Forestry Guides, General office, Reading, Pennsylvania.

In presenting to the Forestry Guides a picture of their new president, the Honorable Charles A. Snyder, we assure them that his personality is just as pleasing as his picture shows. He is aggressive in whatever he undertakes, shows good judgment, and has a ready wit; in fact, he possesses just the qualities of a good leader, as his success in public life proves.

Mr. Snyder is at present State Treasurer of Pennsylvania. He had been Auditor General of the State, and made such a remarkable record in that position that he received the nomination for State Treasurer without opposition. Prior to that, he had served three terms in the Assembly and was serving his third term in the State Senate when he was elected to the higher office. In all these years he was especially popular with the young voters, who supported him without regard to the party to which they belonged.

Mr. Snyder was born at Pillow, Dauphin County, Pennsylvania. He received his education in the public schools and at the old New Berlin and Berrysburg Academies, and later read and practiced law in Pottsville, where he has since resided. Here he has a beautiful home and home-life with his wife, a daughter and a son, the latter being at present a senior in Pennsylvania State College.

During the years that Mr. Snyder was in the State Legislature, he supported every measure proposed that aimed at conserving the natural resources, assisting the industries or improving the roads and institutions of the State. To him is conceded the credit of putting new life into the public schools of the State by introducing the first bill to increase the salaries of teachers.

It is quite fitting that a resident of the state which received its name from the magnificent forests that covered its entire area at the time of its settlement, and which suffered more than any other state by reason of reckless destruction of those forests, should now be the first leader in a nation-wide movement to restore the forests of the entire country to something of their former usefulness and beauty.

DECLARATION OF PRINCIPLES OF THE AMERICAN FORESTRY GUIDES

IT IS A VOLUNTARY SERVICE ORGANIZATION for the creation of sentiment among the youth of America to conserve and preserve our forests, tree, plant, bird and harmless wild life thereby conserving the youth with the forests. It aims to help the youth to become self reliant, and develop true citizens and teach to do by doing.

IT IS ABSOLUTELY INDEPENDENT, having no official connection with any federal or state department. It is not controlled by any special interest or agency. It is non-military, non-sectarian, non-political.

It will function as a volunteer service auxiliary with our federal and state departments, promoting causes for our common good and offering full cooperation. It will devote itself to public service and is pledged to abet national, state and community welfare, progress and prosperity.

It has for its major objective conservation of the forests and other natural resources by the youth of America. The youth by making available an educational program whereby the trees can be identified without specialized training in forestry; the birds without becoming an ornithologist; the wild flowers, without detailed knowledge of botany. It promotes health and body building. It recognizes that our country's greatest asset, its youth, must be conserved.

It will know but one flag—The stars and stripes.

It has for its motto "Service to God, to Country, to Fellowman."

EDITORIAL

MINIMUM REQUIREMENTS

A NEW phrase has recently come into forestry language. As covered by the two words "minimum requirements," it commonly refers to the minimum of protection and silvicultural practice which will assure natural regeneration or perpetuation of forest growth.

It means much because in the present status of forest legislation and management in America, the attainment of the minimum is yet the first step. In anticipation of the formulating of a national forest policy sufficiently satisfactory to be adopted and applied, a very wise preliminary step is being taken by the Chief Forester in ascertaining the minimum requirements of representative forest regions. By such studies and through the discussions which naturally follow, the problem is made more concrete thus giving promise that the essentials which have long been obscured, with perhaps some new recommendations, will become generally recognized and actually applied in the woods.

As has been frequently pointed out by American Forestry and by all who have any knowledge or interest in the forests, fire protection is the absolute minimum under any plan or policy, since without it there can be no new forests, and the old ones will always be jeopardized. All other requirements are secondary, and there is a growing conviction that if systematic fire protection is attained through federal and state agencies in cooperation with private owners, backed by an enlightened, aggressive public opinion, which will curb the danger from careless or malicious individuals, at least a good start will have been made towards a new forest growth on cut-over lands.

The several things which represent the minimum silvicultural requirements vary widely in different regions and with the character of ownership. Whether we have a diameter limit of six or twelve inches, or none, or require top lopping or brush disposal of softwoods and not of hardwoods, or neither or both, is a local problem to be worked out and applied as such. Foresters can do much to assist nature, the application of their profession ranging from the reforestation of absolutely denuded areas to the regulation of cutting and systematic plans of management which increase both the volume of wood production and its quality. The things which they could do, however, cannot always be done, because of economic limitations, hence the importance of local studies which give a basis for specific action rather than generalization and no action. In the meantime, natural reconstructive agencies are on duty every minute.

The minimum requirements in any region must be known and applied before the maximum measures may be taken. Forestry, like every other great development is an evolution, and while America can draw on the technical knowledge and experience of Europe the growth of public sentiment and the changes in the economic influences are almost as slow as though there was no European background of knowledge and experience.

Forestry progress in the United States during the past twenty years is represented largely by fire protection and education, and in these notable progress has been made. On the national forests and to a much less extent on state lands, there has been a beginning in actual forest management, but elsewhere the movement has been largely conversation. The great saving factor is that the forests have regenerated themselves over enormous areas of cut-over land, and while this has been restricted and damaged by fire, these new forests have a greater extent and value than is generally recognized. We continue to forget that new forests cannot be grown in a day nor by talking about it, and in making plans and policies, it is becoming continually more apparent that if reasonable minimum requirements in keeping with regional conditions are applied, a foundation will be established on which to build and expand to meet the wood requirements of posterity.

PROFIT IN FOREST RECREATION

NO small amount of space in these columns has been devoted to telling of the recreation to be found on Forest lands. The majority of the articles have dealt with some problem of use rather than production. Now with Congress soon to consider the budget for the coming year it may be only good business to spend some time and thought in summing up the amount of money we have invested in recreational development in our forests, what it is producing on that investment and what is needed to place in our Forests at least the more urgently needed recreational developments so they may more efficiently produce recreation.

It may be a new thought to consider the Forests a place comparable to a plant manufacturing recreational products. Maybe recreation should not be viewed as a commodity. And yet it is sold in the amusement market every day in the year. There is a regular basic price per hour that will provide one with decent recreation. And those places which offer this product on the market are nothing more than recreation manufacturing concerns. Therefore if the Forests produce recreation comparable to that found in the city markets it is logical to think of the entire system of Forests as potential recreation manufacturing plants.

What are the products in Forest Recreation? They are many and cannot be rightfully nor fully computed on the market price basis. Yet it will be worth while to compare them in a general way with the cost of what is sold in marts of amusement.

It is estimated by actual count that in 1920 more than four million people visited the National Forests of our country each staying approximately two and a half days.

In this way more than ten million recreation-days were secured which were in every case at least ten hours long. If this is computed on the lowest possible cost of recreation in the market or ten cents an hour it would mean each day was worth not less than a dollar to each person securing it, or for the entire Forest system there were "marketed" ten million dollars worth of recreation units. Even on this basis which is wholly inadequate the recreation commodity in the Forests topped all other receipts from other sources in forest products combined. Only these people were not charged a cent for this use which is theirs by right so this money was not collected. Collection or no collection, the value of recreation is still there.

This is putting recreation in the Forests on the dime and dollar basis. It is the lowest estimate we can make of the use. A dime an hour will never cover the real values nor will a dollar. The real values lie in better health, cleaner minds and bodies, broader vision, greater love of country, increased efficiency, keener knowledge of nature and God and the many other body, soul and mind benefits which come from play in the open.

* * *

Can these be reduced to a market value? Where is there a place that you can buy so many hours of communion with God through Nature? Where can we get a ton or so of patriotism and at what price? Is there a place where they sell good health by the hour and what is the cost? There is no place in the land where such values can be produced better than in the National Forests and therefore our manufacturing plant for recreation found there is one of the most important factors in the future of the land producing and delivering directly to the populace as it does, these values which cannot be measured in money.

It is perfectly conceivable that through outdoor play this Nation will come to produce a race of men and women of greater thinking powers, more robust bodies and finer souls than the world has ever known. The cities will never do it. The Forests alone will never accomplish it. But a combination of city in which to apply the lessons learned in the Forest and the Forest in which to turn for strength and inspiration when the city palls may do it. If it is to be accomplished we must come to recognize and never lose sight of the fact that if we are to produce the recreation to do this we must organize it and develop it so it may be of service just as surely as we have developed our other great producing plants of the country.

These are the products from our plant for human service in the Forest. Ten million days of play of unbeatable quality were produced through the human use of Forest lands in the one year. With this mammoth annual production it is reasonable to suppose that some substantial sums have been put into improvements which make this use possible but—

Congress has never appropriated one cent for recreational improvements in the National Forests!

It is a fact that a ten million dollar value on the market price basis is produced in the human use of our National Forests each year without there having been one dollar officially spent by the Nation to produce it. In a few places local people have spent a few thousand dollars to provide necessary improvements to make the use of the Forests *safer*. But the use is National in scope and the local people should not have to develop that which will be of benefit to the entire Nation.

At first glance it may seem that local inhabitants will make the greatest use of these developments. That is true. But do not local inhabitants reap the benefit from improved highway development? Immense National funds go into this activity each year and while the people in distant states may have some benefit from a direct use of the road it more generally is used in local traffic.

Then is it not true also that if the health of a city near a National Forest is made better by the use of the playgrounds there that it raises the health, spirit and productiveness of the entire country just that much? It is small that is true but is it not the same sort of a situation as the highway example? The Nation benefits through the individual and this is true in Forest Recreation.

* * *

But the application and comparison does not cover the entire situation. The use of the National Forests for play is truly National. In the first place they are located East, West, North and South. They can be easily reached from population centers. And in the second place the Forests of the West have each year thousands of visitors from every state in the Union. Every one seeking the mountain lands of the West uses the National Forests for some sort of recreation and through these individuals from the many states the city, county, and state of which they are citizens benefit from forest play.

Last year Forester Greeley asked Congress for the small sum of $50,000 to be placed in recreational improvements in the Forests. Such an amount would not begin to even take care of the sanitary features. This small asking must have been wholly based on the need for economy rather than on what should be done. In spite of the fact that this would and should meet only the most imperative needs this item was stricken out of the bill in the sub-committee.

This eliminated the possibility of securing National funds for developing the producing and protection features of Forest Recreation last season. If it were fully realized that such a fund would have produced a million dollars more worth of recreation it probably would have been demanded by the public in general and have been endorsed by this sub-committee. And if it were generally realized that such an expenditure is necessary to protect human life in the Forests it would unquestionably have received more consideration than it did. These two conditions are true.

This fall Col. Greeley is asking for the extremely modest sum of $10,000—to take care of the protective situation in camp areas on 152 National Forests totaling 156,000,000 acres! It will not begin to do this, of course, but it will eliminate a few of the most dangerous places.

The success of this item depends upon the realization of the people that it is the beginning in the securing of the funds which are necessary just to make fit for use those places now visited by millions who come to the Forests for play and rejuvenation and upon their power to impress Congress with the necessity for making this start.

It is imperative that this and more money be appropriated as quickly as possible to prevent the loss of human life. The figures of the Board of Health of Colorado show that in the last three years from 1918 to 1920 inclusive, 311 people died of typhoid fever. Nearly every case can be traced directly to infection contracted while the person was on a camping trip in the hills. And this means for the most part National Forests. If one hundred people per year are killed in this state through the lack of proper sanitation it is probably true that ten times that number are similarly stricken in the remainder of the twenty odd states where are National Forests. If this little appropriation will prevent the death of one half this number it will mean that only $20 per life has been spent to save it. Is not a human life worth at least $20?

This little item of $10,000 will not take care of the urgent needs for sanitation in the National Forests. It will not touch the field of real development to produce recreation as a regular organized forest product—a thing which good business efficiency demands. Several hundreds of thousands of dollars are needed at once to even make the present areas used in the Forest efficiently producing recreation machines. But this little drop in the bucket of what should be done will without doubt mean better sanitation in some camping places where conditions are dangerous to human life. This is sufficient reason for this to have every support, every consideration possible from Congressmen and people at large.

* * *

We are reaping an annual profit of ten million dollars worth of recreation from the National Forests without a cent of investment in producing machinery designed for this use. But beyond this we are producing values in inspiration, health and greater efficiency within the Nation which are beyond any dollar scale measurements.

But there is a waste—a loss. One hundred human lives per annum in one state are snuffed out through typhoid contracted on camping trips. Proper sanitation means no typhoid. But funds must be secured to introduce proper sanitary developments. That is what this little appropriation of $10,000 if passed, will start out to do. No more urgent need exists in the Nation today than that of proper sanitation in these play areas.

It has been stated in the press that 75 bodies have been recovered from the Pueblo flood. Hundreds of thousands of dollars flowed into the stricken city for relief. The entire Nation responded individually and officially. And yet in the same state the lack of proper sanitation in the mountains yearly takes thirty three per cent greater number of lives than this figure. And not a cent has been forthcoming to relieve this far worse known annual death list.

Forest Recreation must be safe and efficient. Sanitation is the first consideration. Any advancement which will make it both, efficient and safe, should have sober consideration. First, life must be protected by sanitaries, clean water and garbage pits. Then attention must be turned to real organized production of the recreation commodity. This pitiful little $10,000 will do the first only in a few localities but it may mean the saving of scores of lives. It does mean a recognition of this activity within the National Forests and makes a start towards the greater field of development which will equip the Forests to properly serve the millions who now come to them for recreation.

So let us get our profit without loss. It can be done. And let us be good business people and invest as much as ten per cent of our annual profit in producing machinery.

Profit—and Loss! The increase of the former comes with the elimination of the latter especially in Forest Recreation. Human kindness and good business both demand a congressional appropriation for Forest Recreation.

ANCIENT "MULLAN TREE" TO BE PRESERVED

THE Mullan Tree, landmark of the old Mullan Trail, the first highway connecting Montana and Idaho with the coast, will be preserved to posterity through the creation of a national monument area by the President.

On July 4, 1861, Captain John Mullan, leader of the party having in charge the survey and construction of the Mullan Trail from Walla Walla, Washington, to Fort Benton, Montana, closed his work at the connecting point of the roads from the east and west, at the head of the Fourth of July canyon, between Wallace, Idaho, and Coeur d'Alene, Idaho. There he marked appropriately a huge white pine tree, which since that time has been known as the Mullan Tree.

HUGE LONE SYCAMORE DISCOVERED

A GIANT sycamore is monarch of the Wabash River bottoms in Gibson County. Eleven feet in diameter, thirty-three feet in circumference and 150 feet high, the lone sycamore stands in the middle of a small field overlooking the Wabash River at a point two miles south of East Mt. Carmel, Indiana. There is no such other tree in Gibson County and nothing like it in this part of the state, so far as is known.

Measurements and photographs of the tree have been taken recently by Vivian W. Agniel, assistant engineer for the Patoka-Wabash levee, and have been sent by him to the American Forestry Association for historic record.

THE AMERICAN WALNUTS

BY JOSEPH S. ILLICK

THERE are fifteen different kinds of Walnut trees in the world. Four of them are native to the United States. The Black Walnut and the Butternut are found in the eastern United States. The scientific name of the Black Walnut is *Juglans nigra,* and that of the Butternut is *Juglans cinerea.* A third species, known as California Walnut, occurs in California and the Southwestern Walnut is found in Texas, New Mexico and Arizona.

The nearest relatives of the Walnuts are the Hickories. These two important groups of timber-producing trees

BARK OF THE BLACK WALNUT

The adjective black refers to the color of the wood and the bark, which ranges from a rich brown to black.

belong to the same tree family, and may be distinguished from each other by the following characteristics:

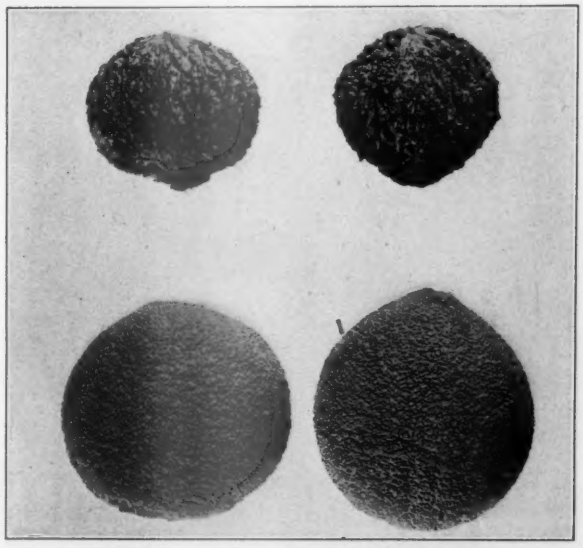
WALNUTS	HICKORIES
(1) Pith of twigs is chambered.	(1) Pith of twigs is continuous, not chambered.
(2) Nuts are rough and sculptured.	(2) Nuts are smooth and usually ridged.
(3) Husk of fruit does not split.	(3) Husk of fruit usually splits into 4 valves.
(4) Tassels of pollen-bearing flowers are thick, compact, not stalked, and occur singly.	(4) Tassels of pollen-bearing flowers are slender, flexible, stalked and occur in three's.
(5) Wood is light to dark-brown. Pores are scattered rather evenly throughout the growth ring.	(5) Wood is white to reddish-brown. Pores range from large to small; large pores occur in concentric rings in spring wood, while small ones are distributed irregularly in the summer wood.

The Black Walnut is unquestionably the best-known member of the Walnut family. It is more fortunate than most of its associates in that it has only a few common names. Throughout its entire range of 650,000 square miles, it is called Walnut, Black Walnut or Walnut-Tree. Rarely, if ever, is any other common name applied to this tree in its entire range. The adjective black refers to the color of the wood and the bark. This distinctive characteristic enables one to recognize it easily from all other closely-related trees.

The Black Walnut bears little resemblance to any other forest tree native to the eastern United States, except the Butternut. These two trees may be distinguished from all other forest trees by their rough and sculptured nuts covered with an unsplitting husk, and by their chambered or interrupted pith. Only a few other trees native to North America have a chambered pith, and the fact that the Walnuts have a brown and chambered pith is one of the best distinguishing characteristics found in any American forest tree. This helpful distinguishing characteristic may be observed by cutting a twig lengthwise and examining the pith, which is always located at or near the center.

The Butternut, also called White Walnut, may be distinguished from the Black Walnut by the following characteristics:

BLACK WALNUT	BUTTERNUT
(1) 13 to 23 leaflets to each leaf.	(1) 11 to 17 leaflets to each leaf.
(2) Bark is dark brown to black.	(2) Bark is gray.
(3) Pith is light brown.	(3) Pith is dark brown.
(4) Nut is round.	(4) Nut is elongated.
(5) Husk of fruit is smooth.	(5) Husk of fruit is hairy and sticky.
(6) Terminal bud is as broad as long.	(6) Terminal bud is longer than broad.
(7) No hairy fringe occurs above leaf-scars.	(7) Hairy fringe present above leaf-scars.



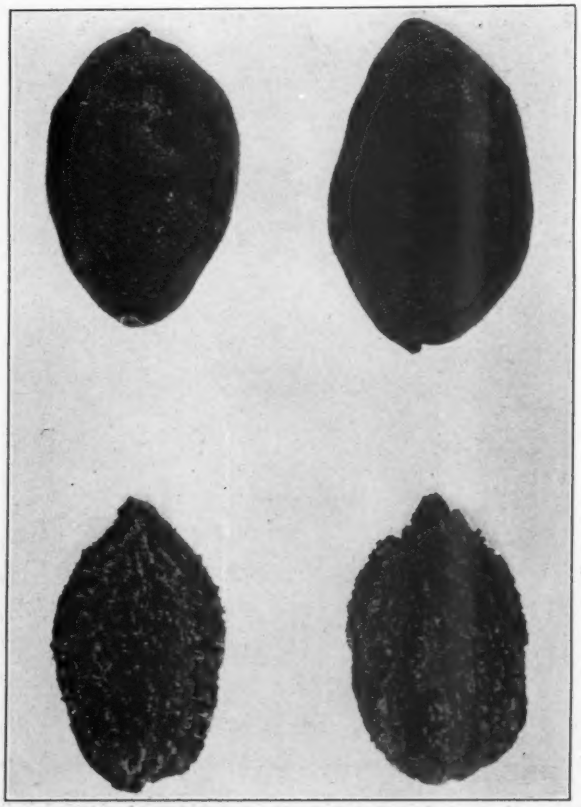
BLACK WALNUTS, WITH AND WITHOUT THE HULL

The black walnut, a favorite because of its sweet, rich fruit, is readily identified in either one dress or the other.

Of all the forest trees found in the original forests of America, the Black Walnut probably suffered most at the hands of the early settlers. This was due to the well-known fact that it stood upon the best land in the fertile valleys and bordering foothills. These areas were selected by the pioneer farmers for their clearings and farms. A large number of the choicest Black Walnut trees were felled and burned simply to get rid of them. Many more were split into fence rails and other similar ordinary uses before the real merits of the wood became known.

Now the wood of Black Walnut brings a high price. It is no longer destroyed and wasted, but every available piece is collected and manufactured into some useful article. It is not used any more for rough lumber as it was in the early days, but all of it goes to factories, where it is converted into finished articles.

The wood of Black Walnut is used for so many different purposes that an attempt to list all of them would become monotonous. Some of its principal uses, however, are furniture, sewing machines, musical instruments and coffins. Lare quantities are also consumed at home and abroad in the manufacture of gun stocks. It was in great demand for gun stocks during the Civil War and fabulous prices were offered for almost any grade during the recent World War. Special scouting expeditions were organized in every part of the country



HULLED AND UNHULLED BUTTERNUTS

Nuts readily recognized by their rough and sculptured shells or their familiar husks.

BARK OF THE BUTTERNUT

This tree is often called the White Walnut because of the light grayish color of the bark on the main trunk and larger branches.

where the Black Walnut grows in order to locate all available supplies, but in spite of this thorough scouting a large number of trees still remain standing. The tree, however, is no longer abundant in any locality, and the total supply of Black Walnut wood in the country is waning rapidly.

The Butternut is one of the best-known nut-bearing trees native to the eastern part of the United States. It occurs along the coast from New Brunswick to Delaware, and extends southward along the mountains to Georgia and Alabama. It reaches westward to the Dakotas, Nebraska and Missouri, and is also found in Arkansas. The Butternut bears a general resemblance to the Black Walnut, but can readily be distinguished from it by the characteristics given in the table that appears in the fore part of this article.

The Butternut is also known as the White Walnut because of the light grayish color of the bark on the main trunk and larger branches. The bark on old trunks is often light brown and that on the smaller branches grayish green. Probably one of the best distinguishing characteristics of the Butternut is its leaflets, which usually number 11 to 17 to each leaf, and are quite sticky and hairy. This sticky and hairy feature is not only characteristic of the leaves but also is found on the fruit. The

THE ROCK-SPLITTING BUTTERNUT

This famous and widely-known old tree is at Devil's Den on the Gettysburg Battlefield.

elongated nuts are also distinctive. The kernel is sweet and has a pleasant flavor, but like that of the Black Walnut, soon becomes rancid. It is more oily than that of the Black Walnut, and because of this distinctive feature the Butternut is often called Oil Nut.

The wood of the Butternut is also a positive means of identification. It is paler than that of the Black Walnut, but it is in no way inferior to it as an ornamental wood. The tree branches freely, often forming many crooks and crotches from which is obtained the highly figured wood prized so highly in the furniture industry. In house furnishing and finishing, Butternut wood is particularly beautiful. The natural finish brings out the quiet tones and the soft luster of the grain in such a way as to give satisfaction to everyone who looks at it.

The Butternut is a rather rapid growing tree, but it is not long-lived . It begins to deteriorate when it reaches medium size, and the trunks of older specimens are usually hollow. Numerous kinds of fungi attack its heartwood, which accounts for many hollow-butted trees that occur along fences and in woodlots. While the Butternut is fairly attractive and thrives well in the forest, and along fences, streams and roads, it cannot be depended upon for ornamental planting.

The two Walnuts which are native to the western part of the United States are the California Walnut and the Southwestern Walnut. The scientific name of the former is *Juglans Californica,* and that of the latter is *Juglans rupestris.*

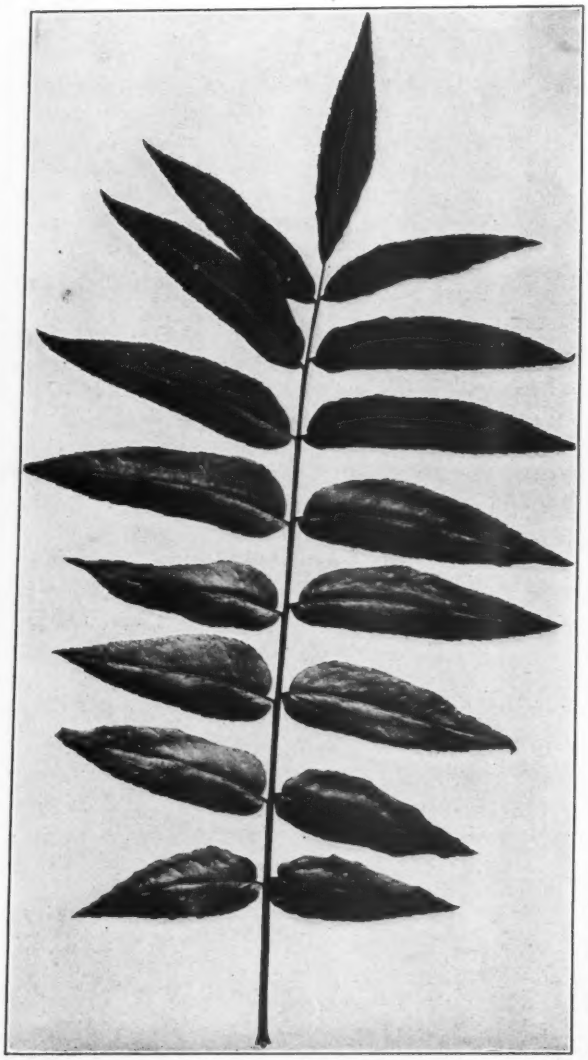
The California Walnut is a small tree. It occasionally reaches a height of 50 feet, and is limited in its distribution to the coast of California, where it occurs from almost sea level to an altitude up to 3,000 feet. Its trunk is usually short, and gives off big branches which curve upward and form a handsome dome-like crown. The bark on large stems is rather rough and blackish but on young trunks and large branches it is smooth and ashy white.

The California Walnut resembles the eastern Black Walnut sufficiently to suggest to anyone that it is a Walnut. Its leaves are compound, with from 9 to 17 leaflets to each leaf. They are light yellowish green in color, and smooth on both the upper and lower surface when fully grown. The fruit is spherical in outline and contains a small thinly covered nut with a sweet kernel. The husk is thinner than that of most other species of Walnut native to North America. If the husk is removed from the hard-shelled nut the two ends appear to be compressed, which gives the nut an irregular and flattened appearance at the ends.

The wood is rather heavy and dark brown, but somewhat lighter in color than that of the eastern Walnuts. It is moderately coarse grained and has some commercial value. The tree, however, rarely grows large enough to produce lumber in sufficient quantities to be of much commercial value. The wood is used chiefly for cabinet purposes, on account of

CALIFORNIA WALNUT SEEDLINGS

This fine young crop is in a Pennsylvania forest tree nursery, and consists of seedlings only one year old which range from 6 to 30 inches in height.



A LEAF OF THE CALIFORNIA WALNUT

The leaves of this species are compound, with from 9 to 17 leaflets to each leaf. They are light yellowish green in color and smooth on both the upper and lower surfaces when fully grown.

its handsome color and good working qualities.

It is a very rapid growing tree in youth, but rarely, if ever, exceeds 150 years in age. Trees from 12 to 15 inches in diameter may be only 10 or 20 years old, while one tree 15 inches in diameter showed an age of only 15 years. Probably one of the most valuable uses of the California Walnut is as a grafting stock for the English or Persian Walnut, which is now being planted on an extensive scale along the Pacific Coast, in the Mississippi Valley and throughout the milder part of the eastern United States.

The Walnut of the Southwest is also a small tree, rarely exceeding 50 feet in height. It develops a trunk which sometimes attains a diameter of 5 feet, but usually ranges from 2 to 2½ feet in diameter. This tree grows on the limestone banks of streams of central and western Texas, where it is rarely more than 30 feet in height. It is commoner and attains a larger size in the canyons of the mountains of New Mexico and Arizona south of the Colorado Plateau. It is also found locally in northern Mexico.

The leaves of this Walnut are from 7 to 15 inches long, and are made up of from 9 to 23 leaflets. The fruit is round, usually from ½ of an inch to 1½ inches in diameter, and covered with a thin husk, which is usually smooth, but is occasionally covered with fine hairs. The nuts have no ridges and are often compressed at the ends, and sometimes flattened somewhat laterally. They are dark reddish brown to blackish in color, usually 4-celled at the base and 2-celled at the apex. The kernel is rather small but sweet, and retains its flavor for a long time. This Walnut of the Southwest is occasionally culti-

BLACK WALNUT

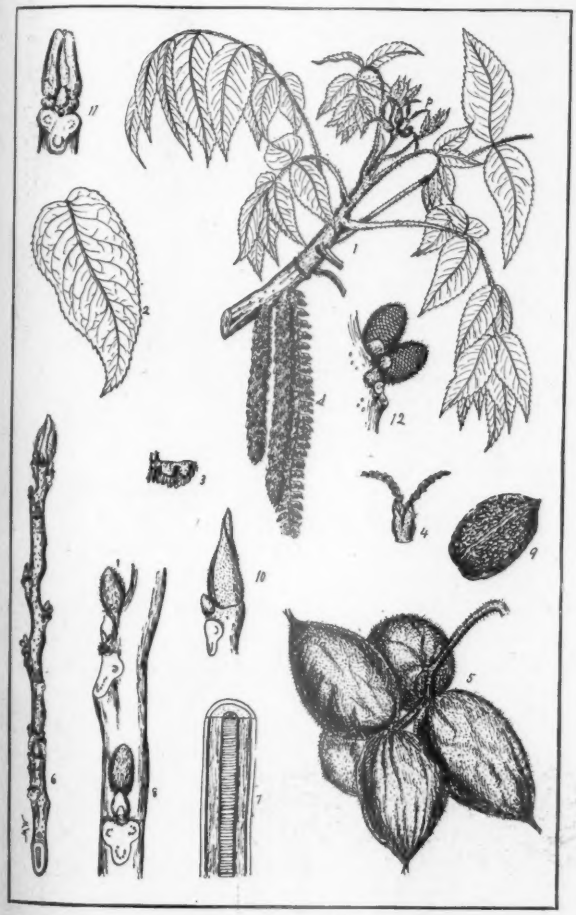
1. Branch with developing leaves and (s) three solitary catkins of staminate flowers and (p) a spike with three pistillate flowers.
2. A staminate flower, slightly enlarged.
3. A pistillate flower, slightly enlarged.
4. A branch with mature leaf and fruit.
5. A winter twig.
6. Longitudinal section of twig showing chambered pith, enlarged.
7. Section of twig showing superposed and gaping buds, and leaf-scars with three clusters of hundle-scars and notched upper surface, slightly enlarged.
8. A nut with husk removed.
9. Terminal section of winter twig showing leaf-scar and terminal bud with bud-scales, slightly enlarged.

vated in the eastern United States, and is hardy as far north as Massachusetts. It is also cultivated to a limited extent in Europe, but no extensive introductions have yet been made either in Europe or the eastern United States.

The two western species of Walnut may be distinguished by the following distinguishing characteristics:

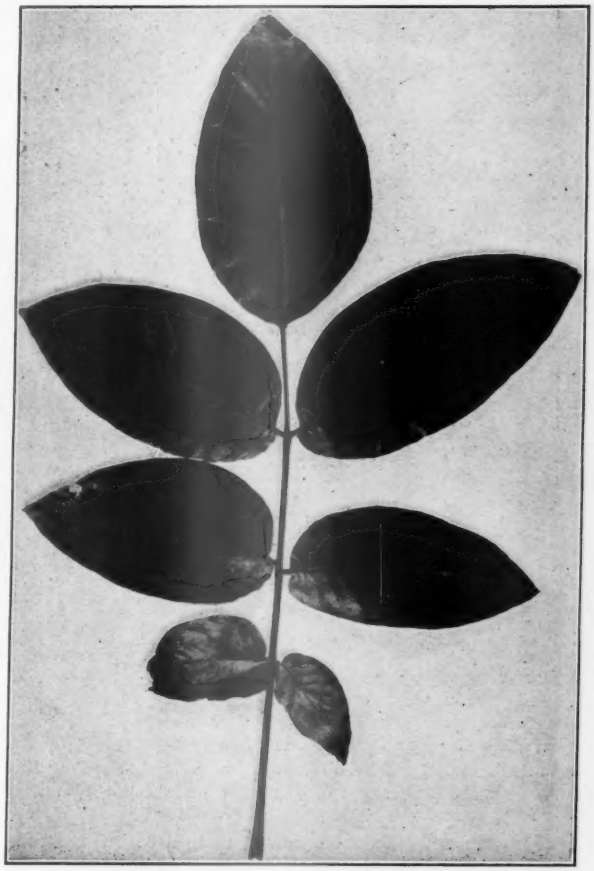
CALIFORNIA WALNUT	SOUTHWESTERN WALNUT
(1) Leaves with 11 to 17 leaflets.	(1) Leaves with 9 to 23 leaflets.
(2) Leaflets 1½ to 3 inches long, and ½ to ¾ of an inch wide.	(2) Leaflets 2½ to 5 inches long and 1-3 to 1½ inches wide.
(3) Nut obscurely grooved.	(3) Nut deeply grooved.
(4) Nuts with rather thin shells.	(4) Nuts with rather thick shells.
(5) Native to California.	(5) Native to Southwest.

In addition to the native Walnuts, a few foreign species have been introduced. The English or Persian Walnut is more widely distributed than any other foreign Walnut It is now propagated profitably in southern California and a considerable degree of success has been had with its cultivation in the Mississippi Valley and the milder parts of the eastern United States. It is a rather



THE BUTTERNUT

1. Branch with one-half developed leaves, (s) 3 unbranched catkins of staminate flowers, and (p) a cluster of pistillate flowers, x ½.
2. A mature leaflet, x ½.
3. A staminate flower, slightly enlarged.
4. A pistillate flower, slightly enlarged.
5. A cluster of mature fruit, x ½.
6. A winter twig showing buds, lenticels, leaf scars, and pith, x ½
7. Longitudinal section of twig showing chambered pith, slightly enlarged.
8. Section of winter branch showing leaf-scars, hairy fringe above leaf-scars and superposed buds, slightly enlarged.
9. A nut with husk removed, x ½.
10. A terminal bud, natural size.
11. A terminal bud (broad-side view), natural size.
12. Section of a branch showing superposed lateral flower buds, enlarged.

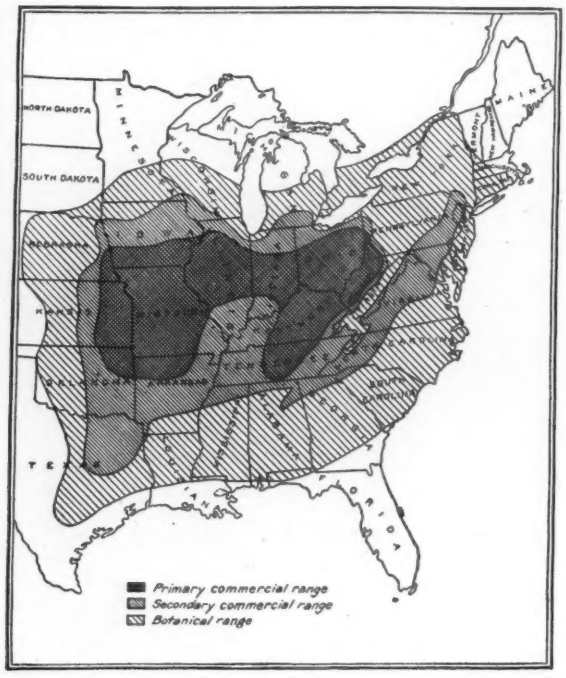


LEAF OF THE ENGLISH WALNUT

The English or Persian Walnut is a valuable economic tree as its fruit is about the most widely used of the walnuts and its wood is the highly valued Circassian Walnut of commerce. The foliage is very beautiful.

A TWO-YEAR OLD SEEDLING

This is a fine young black walnut growing on a plantation in northern Pennsylvania.



(Courtesy U. S. Dept. of Agriculture.)

THE RANGE OF BLACK WALNUT

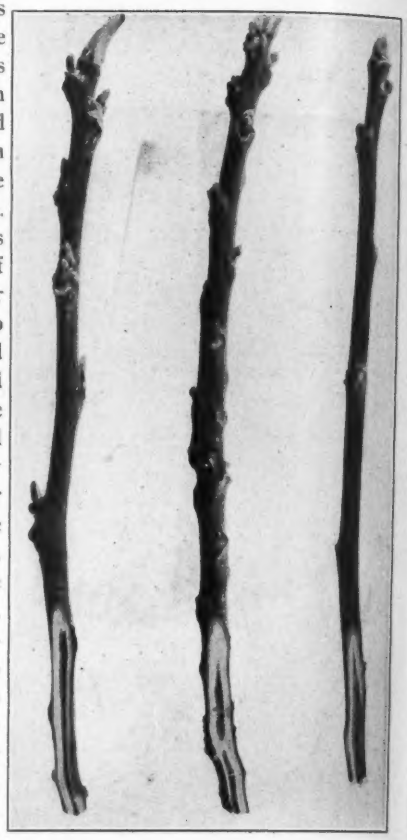
That there is a considerable quantity of walnut still left in the country is due to the immense area on which the species grows and not to the presence of large supplies in any one region.

tender tree and will not endure the cold of our northern winters. Even if its fruit was less valuable it might still be planted for its wood, which supplies the famous Circassian Walnut lumber so widely known and so highly prized in the furniture business throughout Europe and America. In addition to these economic values, this tree also has merits from an ornamental point of view, since it has an attractive bark and beautiful foliage.

Another Walnut which is occasionally introduced into the United States is the Japanese Walnut. It is a small tree of the Butternut type, and promises to become quite profitable in the regions where the English Walnut is not hardy. It is a prolific bearer and its fruit is said to be superior to that of our native Walnuts.

The Walnuts as a group tend to vary and inter - cross, and consequently many natural hybrids have been produced. New and better kinds of Walnuts will undoubtedly be propagated by horticulturists from time to time but it behooves us all to keep on planting the old kind, especially in the regions where they are native. We may thus atone for some of the sins of our forefathers, who stripped the land of the first and most valuable Walnut crop, and unfortunately were not able or willing to provide for another crop.

Walnuts are not hard to grow. It is recommendable, however, to plant the nuts rather than seedlings, for during the first year walnut seedlings develop a long tap-root, and in transplanting the little trees the tap-root is very apt to be injured, and sometimes the effect of such injury may continue to interfere with the tree's growth for many years. Considerable work has already been done in the establishment of walnut plantations in the United States. Many fine groves can now be seen throughout the country. Boy Scouts have been doing good work along this line, and many of the forest organizations throughout the country have also taken up the work. In 1919 more than 150 bushels of Black Walnuts were planted in a single nursery in southern Pennsylvania, and in 1920 more than 200 bushels of Black Walnuts were planted in the nurseries operated by the Pennsylvania Department of Forestry.



THE WALNUTS HAVE A CHAMBERED PITH

An almost infallible distinguishing characteristic of the black walnut is its chambered pith, readily discovered by splitting a twig lengthwise or cutting into it, as illustrated.

A LARGE NURSERY BED

Pennsylvania is doing her part in bringing back the walnut, for there are 22,000 one-year old black walnut seedlings at this Mont Alto nursery.

Tree Stories For Children

Apollo's Laurel

By Mary Isabel Curtis

It was because of Apollo that Daphne was unhappy. Daphne was a wild, young thing. She loved the beasts and birds and flowers better than she did human companionship, and she wished for nothing better than to play among the forest trees the rest of her life. But the River-god, her father, had told her that he wished her to marry Apollo, the golden-haired young sun-god. Apollo was as clever as he was fine looking, for he could play on any kind of musical instrument you might choose to give him, and speak in poetry as easily as he could in prose. But Daphne did not wish to marry anybody.

"Let me be free," she said, "to live among the trees and flowers as I have always done, for in no other way can I be happy."

But her father would not listen. So Daphne was sitting in the forest thinking of what he had said and feeling very much depressed. Suddenly she looked around and saw Apollo coming toward her. She jumped up from the ground to run away. Then Apollo saw that she was frightened and called to her:

"Daphne, dear, don't run away, I want to talk to you. Don't be afraid of me."

But the sound of his voice lent wings to Daphne's feet. She ran as fast as she could go, and Apollo, not liking to be left behind, ran after her. Now, although Daphne could run like a deer, Apollo could run faster still, and she soon saw that he was going to catch her. At that, she called to Mother Earth to save her from being taken. Immediately a change came over Daphne. Her feet took root in the ground, her arms and fingers turned to branches and twigs, her dress became rough bark and her lovely curling hair was changed to countless rustling leaves. When Apollo caught up to her she had become a beautiful laurel tree.

"You have escaped me," he said, and laid his hand upon the tree. "But since you cannot be my wife you shall be my tree and I will wear you for my crown. You shall never know decay, but shall be always green, and wherever it is seen, the laurel wreath shall be the sign of victory." As he spoke, Apollo felt a little tremor shake the tree and he knew that Daphne had been pleased with what he said. And this is why the laurel wreath has always been considered as the highest prize that anyone can win.

THE GLACIER HIGHWAY IN ALASKA

BY JOHN D. GUTHRIE, U. S. FOREST SERVICE

FEW people know that it is possible now to visit an Alaskan glacier by automobile—and yet one can hire a car in Juneau at any of the numerous garages, and by a drive of only 11 miles, over a good road, visit Mendenhall Glacier.

This drive is over a part of what is to be known as the Glacier Highway, which when completed will extend from Juneau, the capital of the territory of Alaska, some 60 miles north to Berner's Bay. It will be entirely within the Tongass National Forest except the small portion within the city limits of Juneau.

This highway is being constructed under a co-operative arrangement between the Forest Service, the Bureau of Public Roads, the Alaska Road Commission (composed of United States Army Engineers), and the Territorial Road Commission. The location, survey and construction work is being done entirely by the Bureau of Public Roads, C. W. Cheatham, Senior Highway Engineer, being directly in charge. The Forest Service, the Alaska Road Commission and the Territorial Road Commission bear the cost.

When completed this highway will be one of the show places of all Alaska. The road starts at Juneau, follows north along Gastineau Channel, past canneries and sawmills, then by farms and dairy ranches, with several silos in sight, for a distance of some eleven miles, where a branch road turns off to Mendenhall Glacier. Autos may approach within a few hundred yards of the glacier and visitors, by a short walk past the power plant, may go out on the glacier. There is a camping site nearby which is used by Juneau people who drive out, bringing tents and camping outfits, and spend a night under the shadow of this interesting age-old ice-mass.

On the steep, rock slopes of the surrounding mountains may be seen the

ALASKA, THE LAND OF POWER AND BEAUTY THIS SHOWS THE INLET TO AUKE LAKE, VIEWED FROM THE GLACIER HIGHWAY. SUMMER HOMES ARE ALREADY APPEARING ON THE TIMBER COVERED SHORES OF THIS LOVELY BODY OF WATER

TO VISIT AN ALASKAN GLACIER BY AUTOMOBILE IT IS ONLY NECESSARY TO HIRE A CAR ON ANY FINE SUNDAY AT JUNEAU AND BY

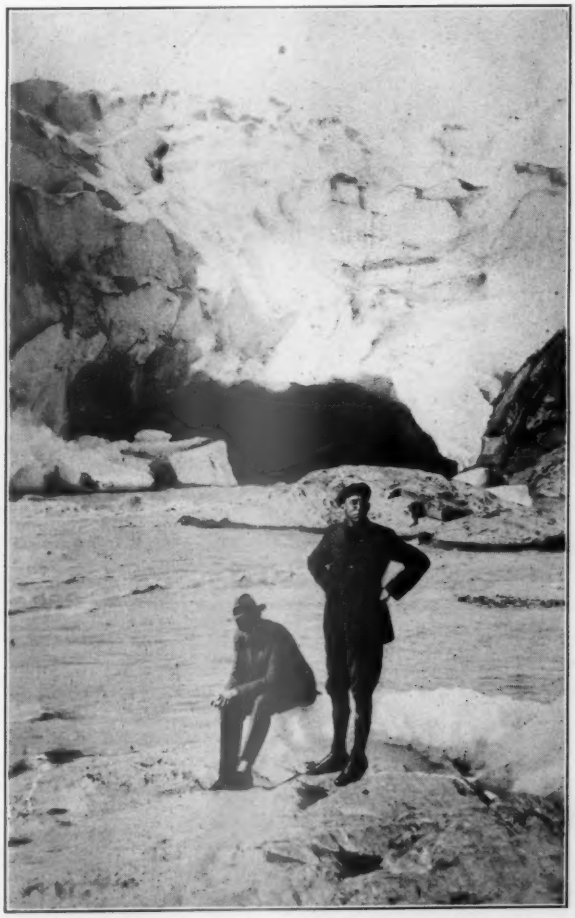
A DRIVE OF ONLY ELEVEN MILES, OVER A FINE ROAD, ARRIVE AT MENDENHALL GLACIER. WHEN THIS HIGHWAY IS COMPLETED IT WILL BE ONE OF THE SHOW PLACES OF ALASKA

carvings of this slow-moving ice-river as it has relentlessly moved downward for centuries. A roaring stream issues from beneath the mass, tearing at the edges of the immense ridges of rock and gravel ever being shoved ahead by the enormous bulk of ice behind. The forest, through centuries, has been struggling to cover the smooth rock sides of the valley, and has begun to creep up on

A VIEW OF THE GLACIER FROM THE HIGHWAY. AUTOMOBILES MAY APPROACH WITHIN A FEW HUNDRED YARDS OF THE GLACIER AND THERE IS A FINE CAMPING SITE NEARBY FOR THE BENEFIT OF THOSE WHO WISH TO SPEND MORE TIME IN THE NEIGHBORHOOD

the terminal moraines, aspen first, flaunting its quivering banners,—now green, now yellow,—with spruces following slowly behind. Here a country in the making can be seen.

Leaving Mendenhall Glacier the highway swings along the west side of Auke Lake where there are fish, boats and bathing. From the highway here magnificent views are to be had on one side, of Mendenhall and Herbert Glaciers, with high above them rugged, snow-capped peaks, and on the other, glimpses of Favorite Channel and Lynn Canal through the heavy stands of spruce timber. Auke Inlet, with points of timber running out almost encircling it, offers charming vistas which will some day delight the tourist. Along the shores of Auke Inlet are a summer home or two, and several canneries, almost hidden from the highway by the fringe of forest between. Although only some fifteen miles of the proposed sixty have been built to date the Bureau of Public Roads is now at work on the construction of the portion along Auke Inlet and will extend the preliminary survey work to Eagle River. In the vicinity of Eagle River there are extensive agricultural lands, some of which are even now being made productive by the eight or ten homesteaders who have settled there. One rancher is said to have cleared $200 from one-half acre of strawberries in 1919. Fine strawberries and raspberries, and such vegetables as cabbage, cauliflower, rhubarb, potatoes, carrots, turnips and celery, are now grown, as well as a bewildering array of flowers. The extensive meadow lands produce a fine quality of native hay, and here are seen sleek cattle and horses in pasture and chickens around the door yards. The Glacier Highway will open up the markets of Juneau, Treadwell and Thane for the



DISTINGUISHED VISITORS AT THE MENDENHALL GLACIER. THIS SHOWS CHIEF FORESTER GREELEY AND DISTRICT FORESTER CECIL AT THE GLACIER ON THE TONGASS NATIONAL FOREST

produce of these farming lands. Even now one rancher is planning on buying a Henry, ahead of the completion of the road to his ranch.

The Glacier Highway will be a wonder way for the tourist a few years hence. It will afford alternate views of glaciers, ice-capped peaks, sea meadows, rivers, rugged mountains, forested islands and inlets, farms, and

MENDENHALL GLACIER—A GOOD VIEW OF THE AGE-OLD ICE-MASS WHICH IS DESTINED SOME DAY TO OFFER INTENSELY INTERESTING STUDY TO THE SCIENTIST, WHEN THE HIGHWAY IS COMPLETED AND FACILITIES OFFERED TO ENTICE TOURIST TRAVEL TO THE REGION

canneries, and will be practically at sea level for the 60 miles of its length. Four large and wonderful glaciers, each covering thousands of acres, are visible from it,—Mendenhall, Herbert, Lemon and Eagle,—where these intensely interesting ice-masses may be visited by the tourist and pleasure-seeker or more leisurely studied by the scientist.

When completed undoubtedly the steamship companies will arrange their boat schedules to enable tourists to leave the boats at Juneau, take the trip over the Glacier Highway through this wonderland of the Tongass National Forest to Berner's Bay, and catch the steamer again on its route to Skagway.

A FOREST FIRE ESSAY

BY HOWARD R. FLINT

DOUBTLESS many foresters and friends of the forest have in their boyhood days spent hours in spellbound interest over Robert Louis Stevenson's "Treasure Island," or "Dr. Jekyll and Mr. Hyde," and have in their later years again read these romances of the golden days of adventure with only a little less than their former enthusiasm. Perhaps not so many have spent a pleasant evening over "Travels With a Donkey" or "Essays of Travel," and probably very few recall this talented writer as a contributor to the literature of forest fires in our California forested region.

For the benefit of foresters and others, particularly for the edification of our brothers of the light-burning persuasion, the famous writer's quaint and vivid description of forest fires, together with his amusing experience and rather startling conclusions on technical matters concerning fire, forest, and climate, are quoted here from his chapter entitled "The Old Pacific Capital" in "Across the Plains." True to his intuitive love of Neptune, he opens his discourse with a reference to the sea, calling to the memory of the initiated, thoughts that take them far from the printed pages before them. I quote a potent paragraph:

"The woods and the Pacific rule between them the climate of this seaboard region. On the streets of Monterey, when the air does not smell salt from the one, it will be blowing perfumed from the resinous treetops of the other. For days together a hot, dry air will overhang the town, close as from an oven, yet healthful and aromatic in the nostrils. The cause is not far to seek, for the woods are afire, and the hot wind is blowing from the hills. These fires are one of the great dangers of California. I have seen from Monterey as many as three at the same time, by day a cloud of smoke, by night a red coal of conflagration in the distance. A little thing will start them, and if the wind be favorable, they gallop over miles of country faster than a horse. The inhabitants must turn out and work like demons, for it is not only the pleasant groves that are destroyed; the climate and the soil are equally at stake, and these fires prevent the rains of the next winter, and dry up perennial fountains. California has been a land of promise in its time, like Palestine; but if the woods continue so swiftly to perish, it may become, like Palestine, a land of desolation."

The fire-fighter who from close contact has filled his lungs and his eyes with the smoke of a real live forest fire may regard as poetic license the reference to a fire atmosphere which is "healthful and aromatic in the nostrils," yet the careful observer recalls a pleasant tang to the smoke of a distant wood fire.

"A little thing will start them, and if the wind be favorable, they gallop over miles of country faster than a horse." This is a word to the wise but careless tourist, and also a timely hint to the ranger or fireman to reduce elapsed time between discovery and control to stop watch units. With this quotation in mind the ranger may also order a few extra men, and strike hard the first day in accordance with good tactics as defined in the foresters' fire manuals.

"The inhabitants must turn out and work like demons," will carry the forester back to interesting and mem-

orable, if not wholly pleasant episodes in his own busy career. If, on the other hand he has fought large fires with crews of the transient "Wobbly" labor of the West, he may be tempted to transpose Stevenson's euphonious phrase and say with some vehemence, "like the devil they will work."

The meteorologist may find theme for a volume in the statement, "not only the pleasant groves are destroyed; the climate and the soil are equally at stake, and these fires prevent the rains of next winter, and dry up perennial fountains." The value of the forest for watershed protection and for its ameliorating effect on climate was noted by this canny and observant Scot at least as long as thirty years since, and a fitting warning sounded. Foresters today, however, are unwilling to take quite so decided a stand on the question of the forest's climatic influence.

"California has been a land of promise in its time, like Palestine; but if the woods continue so swiftly to perish, it may become, like Palestine, a land of desolation." California has been! Consider such a warning! Well, California elected a president in 1916. It may never do so again, and the scene of desolation may well be more definitely forcasted in the arid wording of the Eighteenth Amendment. Who other than California's native sons will gainsay the author's prophetic vision.

To quote further, Stevenson says:

"To visit the woods while they are languidly burning is a strange piece of experience. The fire passes through the underbrush at a run. Every here and there a tree flares up instantaneously from root to summit, scattering tufts of flame, and is quenched, it seems, as quickly. But this last is only in semblance. For after this squib-like conflagration of the dry moss and twigs, there remains behind a deep-rooted and consuming fire in the very entrails of the tree. The resin of the pitch pine is principally condensed at the base of the bole and in the spreading roots. Thus, after the light, showy, skirmishing flames, which are only as the match to the explosion, have already scampered down the wind into the distance, the true harm is but beginning for this giant of the woods. You may approach the tree from one side, and see it, scorched indeed from top to bottom, but apparently survivor of the peril. Make a circuit, and there, on the other side of the column, is a clear mass of living coal, spreading like an ulcer, while underground, to their most extended fibre, the roots are being eaten out by fire, and the smoke is rising through the fissures to the surface. A little while, and without a word of warning, the huge pine tree snaps off short across the ground, and falls prostrate with a crash. Meanwhile, the fire continues its silent business; the roots are reduced to a fine ash; and long afterwards, if you pass by, you will find the earth pierced with radiating galleries, and preserving the design of all these subterranean spurs, as though it were the mould for a new tree instead of the print of an old one."

Accurate and vivid description this, to have been written by one of but scant experience with fire. The light burning "Piute" forester will do well to note the casual observer's record of "a deep-rooted and consuming fire in the very entrails of the tree." Perhaps this consuming fire gained ingress through the scar of a previous "Piute" fire. Doubtless, too, the tree whose roots "are reduced to a fine ash," are those afflicted with a butt rot or some form of root decay, for it is a rare thing for green sound wood in large trees to burn in the most severe forest fire, or even in the deep-rooted consuming fire that follows a crown or surface blaze.

Stevenson continues with a warning, timely thirty years since, anent the danger that an interesting species confined to a narrow range may become extinct unless protected against the arch enemy of the forest.

"These pitch-pines of Monterey are, with the single exception of the Monterey cypress, the most fantastic of forest trees. No words can give an idea of the contortion of their growth; they might figure without change in a circle of the nether hell as Dante pictured it; and at the rate at which trees grow, and at which forest fires spring up and gallop through the hills of California, we may look forward to a time when there will not be one of them left standing in that land of their nativity. At least they have not so much to fear from the ax, but perish by what may be called a natural although violent death; while it is man in his short-sighted greed that robs the country of the nobler redwood. Yet a little while and perhaps all the hills of seaboard California may be as bald as Tamalpais."

A sober warning this: "Yet a little while and perhaps all the hills of seaboard California may be as bald as Tamalpais." Whoever has seen Tamalpais with its bald dome can appreciate the strength of the simile.

There follows then a lively account of the author's own intimate experience with fire in the forest; an experience so unusual, yet so exactly in accordance with human nature, especially tenderfoot human nature, that it appeals to one at once as being a true account of one of those exasperatingly foolish acts in which every one is from time to time overtaken,—the kind of inspiration which usually ends in humilitation and which occasionally is rewarded by a tragedy.

"I have an interest of my own in these forest fires, for I came so near lynching on one occasion that a braver man might have retained a thrill from the experience. I wished to be certain whether it was moss, that quaint funeral ornament of Californian forests, which blazed up so rapidly when the flame first touched the tree. I suppose I must have been under the influence of Satan, for instead of plucking off a piece for my experiment, what should I do but walk up to a great pine tree in a portion of the wood which had escaped so much as scorching, strike a match, and apply the flame gingerly to one of the tassels. The tree went off simply like a rocket; in three seconds it was a roaring pillar of fire. Close by I could hear the shouts of those who were at work combating the original conflagration. I could see the wagon that had brought them tied to a live-oak in a piece of open; I could even catch the flash of an ax as it swung up through the underwood into the sunlight.

Had any one observed the result of my experiment my neck was literally not worth a pinch of snuff; after a few minutes of passionate expostulation, I should have been run up to a convenient bough.

To die for faction is a common evil;
But to be hanged for nonsense is the devil.

I have run repeatedly, but never as I ran that day. At night I went out of town, and there was my own particular fire, quite distinct from the other, and burning as I thought with even greater vigor."

Had Stevenson in the present unromantic day undertaken by similar means to satisfy his curiosity, he would doubtless have been shadowed to his lair by some efficient member of the Arson Squad, hailed into justice court, and very properly fined ten dollars and cost, with a stern warning thrown in. Cheap experience at such cost, we may reflect after reading again his entertaining account of the episode. Doubtless the sternest forest guardian, if he will read Stevenson, can forgive him his rash experiment with fire, in return for his interesting account of the incident.

NOTING the picture of a cluster of 19 pitch-pine cones in the August issue of *American Forestry*, Mr. William L. Worcester, of Intervale, New Hampshire, writes that he has had for many years as a curiosity a similar cluster of pitch pine cones containing thirty-two cones, found in his neighborhood long ago.

DIRECTORS STUDYING FORESTRY CONDITIONS

Dr. Henry S. Drinker (side view) and Charles F. Quincy, directors of the American Forestry Association and members of the Forestry Committee of the Chamber of Commerce of the United States investigating forestry conditions in the Pacific Coast Douglas fir forests.

MAHOGANY

BY JOHN J. BIRCH,

THERE is perhaps no wood more cherished for cabinet purposes than mahogany. Its fine tracery of dark and light brown lines, which become more and more pronounced with age and polishing, together with its freedom from warping or twisting in seasoning, has given it the high place which it occupies among furniture woods. It is a native of the tropics. Contrary to the prevalent belief it does not grow in great forests; but is sparsely scattered through the tropical jungles. A bulletin of the National Union of the American Republics states: "There is no such thing as a forest of mahogany. The pine loves its own kind, and never thrives better than when planted by nature or by man, one tree next to the other, for mile after mile, on plain or mountain. Other trees are found in groves or clumps, seeming to form little settlements within the woods. The mahogany tree, however, lives by and for itself alone; standing solitary of its species, surrounded by the smaller trees and dense undergrowth of the tropical forests, rearing its head over its neighbor." Very often only one or two trees may be found per acre.

The personnel of a mahogany lumbering outfit is the same in many respects as a lumber camp in any American forest, save for minor details. Belize, in British Honduras, is the chief exporting city for mahogany, and for that reason most of the outfits are made up from there.

The methods used in harvesting are exceedingly primitive, inefficient and relatively expensive. The cutting begins in the mid-summer, which is the rainy season. The tree hunter, or the one whose duty it is to locate the tree, is by far the most important man in the outfit. His first move is to pick out some elevated point and climb the highest tree and from there locate the mahogany. This is a comparatively easy matter, for at this season of the year the leaves of the mahogany have turned a reddish yellow hue, while the other trees are green, thus making a decided contrast, visible for a long distance. After having carefully noted his bearings, he proceeds to locate the trees. This is by no means an easy task, for in most places the underbrush is so dense that it is necessary to actually chop one's way through.

The trees are large and spreading with pinnate, shiny leaves. They range anywhere from fifty to one hundred feet high and are from ten to twenty-five feet in circumference at the base, depending on their age. It is the custom to build a platform, some eight or ten feet high, around the largest of the trees for the reason that the trunks are greatly enlarged at the ground. But by so doing, a great deal of the most valuable wood is lost, for it is here that the most beautiful graining and toughest timber is found. In felling, great care is taken so that the logs will not split or break. The trees are then cut into

(*Continued from page 727*)

THE FLOWER OF INDIAN SUMMER

BY BESSIE L. PUTNAM

When wandering along the banks of some stream in the last sunny days of the year, we may happen upon the pale yellow flowers of witch hazel, without question the last ones of the year. This is a large shrub or a small tree, sometimes reaching a height of 25 feet, but is never large enough to furnish wood of commercial importance.

The flowers are strap-shaped, and in small clusters at the axils of the leaves. Often the ripened fruit of the previous year appears with them, but more frequently it has been just scattered, and there remain only the twin wooly pods with empty sockets showing where the seeds have been. Though by no means showy, the flowers are interesting, matching in color the increasing yellow of the leaves. Yet though we may think of them as slow in appearing, are they not really in advance of the normal forest flowers? Examine the autumn formed buds of the maple and beech. You will find them ready in embryo to open with the first genial spring sunshine. The witch hazel just carries the process a step farther, and opens in late October or November.

Many plants have special facilities for scattering seed. In this respect, the witch hazel is unique. The pods of touch-me-not spring back, throwing the seeds quite a distance. The witch hazel bursts in a still more forcible manner, and the two shining black bony seeds are thrown very much farther. William Hamilton Gibson, who experimented much with them, declares that the momentum of the seed would commonly carry it twenty and often thirty feet, and "in one or two instances the diminutive double-barreled howitzers succeeded in propelling their missiles to the distance of forty-five feet by actual measurement." Those who wish to test the projectile power of the witch hazel have only to place a small branch with the unopened seed-pods in a warm room. In a few hours curious snapping sounds will be heard. These, when traced, will be found to be the horny seeds, thrown to all parts of the room.

In olden times the forked branches of this shrub were held in high repute as divining rods. No one would think of digging a well without first making use of them in pointing out the place where water could be found. If the witch hazel was not obtainable, a peach limb was sometimes used, but was considered less reliable. In old times, too, the Indians discovered medicinal qualities in the plant which are still credited to it, and through which we have now several reliable medicines.

It is a strange fact that while the flora of the Atlantic slope is radically different from that of the Pacific, some of our Eastern flowers skip over to Japan and are abundant there. Of the three known species in this genus, ours is native only to America while the two others are found in Japan. It is a cousin to the red gum, which has recently grown so popular in the furniture trade.

Indian Summer

It is the Indian summer. The rising sun blazes through the misty air like a conflagration. A yellowish, smoky haze fills the atmosphere, and a filmy mist lies like a silver lining on the sky. The wind is soft and low. It wafts to us the odor of forest leaves, that hang wilted on the dripping branches, or drop into the stream. Their gorgeous tints are gone, as if the autumnal rains had washed them out. Orange, yellow and scarlet, all are changed to one melancholy russet hue. The birds, too, have taken wing, and have left their roofless dwellings. Not the whistle of a robin, not the twitter of an eavesdropping swallow, not the carol of one sweet, familiar voice. All gone. Only the dismal cawing of a crow, as he sits and curses that the harvest is over; or the chit-chat of an idle squirrel, the noisy denizen of a hollow tree, the mendicant friar of a large parish, the absolute monarch of a dozen acorns.—Longfellow.

A New House

To-day on our street is a new frame house
Which the carpenters finished at noon; I see
That sawdust and shavings still litter the porch;
It is sweet to be built of a forest tree.

A house that is fashioned of brick or stone
May be fine. But from branches that wave in rain
And snow, that have shaded the violets,
That have heard all the winds and each bird's refrain,
That draw of their strength from the Earth's warm breast,
Have been touched by the sunlight and blessed by the dew,
Have awakened at dawn and have loved the dusk,
Their sweetness may enter the new house, too.

A home, I think should be built of the best
And a tree that has grown in the forest loam
Is the best material God could make
To be used by a man when he built his home.

—SOPHIE TUNNELL.

THE HALL OF FAME FOR TREES

THE trees pictured on the opposite page have been nominated for the Hall of Fame for Trees because of their connection with the history of America or for some special reason which sets them apart distinctively as objects of interest and so worthy of a place in this all-American gallery. The inserts are numbered and their description follow:

1. A great-grandson of Dr. Samuel Johnson, first president, in 1754, of King's College, now Columbia University, once owned the land on which this tree stands. The Oak is nominated by Miss Helen Harrison of Bound Brook, New Jersey. This tree stands about half-way between Stratford and Bridgeport, Connecticut, and experts say that it is 500 years old. A century ago it stood on a 300-acre estate owned by Edwards Johnson, son of Samuel William Johnson, who was a son of Dr. Johnson of King's College. The property changed hands many times, being owned by Joseph de Rivera, a Porto Rican sugar planter; the Lawrences; William Painter, and David Hollister. When the city of Bridgeport opened up the land, W. R. Bates bought the lot on which the tree stands and built a retaining wall about the tree to help save it.

2. Clifford Van Tassel, a tree specialist of Tarrytown, New York, describes this mammoth White Oak as the monarch of New York treedom. Mr. Van Tassel made this photograph, which is so indicative of the sterling qualities of oak—permanency and strength. The tree, which is 14 feet 8 inches in circumference at breast height, is 70 feet high and has the remarkable spread of 118 feet. A large stub recently removed from the trunk 35 feet up showed 112 annual rings. It is estimated that the tree was standing when the first white settler set foot on the soil that is now New York. It has been placed in nomination for the American Forestry Association's Hall of Fame for Trees by the New York State College of Forestry at Syracuse, New York.

3. In the beautiful Stewiacke Valley, in Nova Scotia, stands the Whip Handle Tree, nominated by John Creelman of Hillburn, New York. The tree has taken a beautiful vase-like shape, Mr. Creelman informs the Association; is about 3 feet in diameter and 75 feet high. This elm is over 200 years old, for, writes Mr. Creelman, "more than 200 years ago my great-grandfather, after a day of plowing, stuck his whip handle or ox goad in the ground at the end of a furrow. In those days oxen were used almost entirely for farm work, and the whip handle or goad had a sharp iron brad in the butt end to remind the oxen at times that more speed was needed." (Photograph by Cox.)

4. Here is the Mystery Tree of Flushing, New York. It is nominated for a place in the Hall of Fame for Trees by Everett P. Martin of Flushing. This tree stands in a field on the northerly edge of Flushing and is in charge of C. H. Rintleman. A nursery was on this spot 150 years ago, but when the tree was planted, or by whom, whether it came from imported seed or as a tree, is not known. The tree is 62 feet 8 inches high and measures 75 feet from tip to tip. Seven feet above the ground it is 13 feet in circumference.

5. On this tree, just awarded a place in the Hall of Fame for trees with a history by the American Forestry Association, Daniel Webster hung his scythe and started for Dartmouth College. The nomination of the tree for a place in the Hall of Fame is made by Frank N. Hancock of Franklin, New Hampshire, who has lived in the vicinity of the tree for 60 years, and H. E. Zimmerman of Kansas City, Missouri. The graveyard in the picture is one in which are buried Webster's father and mother, as well as brothers and sisters. Webster was born on January 18, 1782. The path from that tree when Webster abandoned the farm work to seek an education led to the halls of Congress at Washington, to the laying of the corner-stone of the Bunker Hill Monument, to the Secretary of State's office, and to the position, in the opinion of many, of being the greatest orator the country has ever seen. Franklin, then called Salisbury, is the birthplace of Webster.

6. Here General Fraser, in command of the British at Saratoga, fell, and when he was shot the rout of the British forces was started. The tree has been nominated by Charles A. Ingraham of Cambridge, New York, who writes that "the second battle of Saratoga was fought October 7, 1777. This tree is a second growth from the original one under which General Fraser was sitting on his horse at the time he was shot. The British line of battle crossed the road. At about 3.30 P. M. the British were in a critical situation, their right flank having been forced back by Morgan's riflemen, one of whom, at the direction of his commander, fired at General Fraser. This calamity caused a panic among the British troops, for Fraser was held in high regard. The ground shown in the picture was quickly crowded with disorganized men, closely followed by the victorious Americans. The tree is about 14 inches in diameter."

7. When old New York was young this White Oak stood between Stony Brook and Setauket, in Suffolk County, Long Island. The tree has been nominated for a place in the Hall of Fame for trees with a history by Wilmot Townsend Cox of 34 Pine Street, New York City. The trees divides into many branches, Mr. Cox points out, and this doubtless is the reason the early day ship builders did not cut it down. As early as 1661 Setauket figured in history, for then it was that "ten coats, twelve shoes, fifty muxes, ten fadom of wampum and one pare of childs Stockins" figured in every purchase of land made by John Underhill, Richard Woodhull, James Cock, Andrew Miller, Richard Floyd and other settlers of Setauket. The famous old tree will never see real estate change hands at those figures again, at least not in that neighborhood. Lewis & Valentine inform the American Association that the tree is the largest on Long Island. It is a trifle more than 19 feet in circumference four feet above the ground.

(*Continued on page 728*)

A GROUP OF TREES, FAMOUS IN AMERICAN HISTORY, WHICH HAVE BEEN NOMINATED FOR THE HALL OF FAME. THEY ARE FULLY DESCRIBED ON THE OPPOSITE PAGE

WOODLAND FLOWERS OF THE PRAIRIE REGION

BY ARTHUR E. ELDRIDGE

ALTHOUGH the grain fields of the corn belt are very extensive still there are numerous small tracts of woodland. Along the river bottoms and adjacent ridges there are larger tracts, usually of heavier growth. Throughout this region much of the woodland is given to pasture for horses, cattle and hogs. Under such treatment the flowers and small shrubs disappear quickly, the open areas being invaded by grass and the woods becoming very bare and uninteresting by comparison with the unpastured areas.

A CARPET OF COLLINSIA, OR "BLUE-EYED MARY"
In Northern Ohio the beautiful Collinsia is a flower of May. It is not abundant, but grows luxuriantly on wet grounds, lowlands or flood plains.

Many people go to these tracts in the Springtime to enjoy the prospect: here an acre or two of bluebells, looking as if a piece of the sky had fallen; there on the hillside a thousand snowflakes of anemones, bloodroot, dutchman's breeches or trilliums.

By reason of the high valuation of land, owners are obliged to make economic use of the wooded areas. Sentiment for preservation of wild flowers, therefore, finds little room

CLAYTONIA, OR SPRING BEAUTY
This beautiful landscape effect is destroyed now, for two years after the photograph was taken all the flowers were gone, presumably due to pasturing.

in their sympathy. If, on the other hand, woodland is to be conserved for its products, pasturing is detrimental to development or growth. Forestry has been practiced little or none in many of the states until recently. Preservation of wooded tracts is essential for many reasons. One of the first is that people may have some objective in country travel; a place to enjoy meals out of doors, get acquainted with the wild flowers and give the children a taste of those things of which they get far too little in this region.

The spring flowers are abundant and beautiful. The most conspicuous are: Collinsia verna, Anemone quinquefolia, Claytonia virginiana, Mertensia virginica, Phlox divaricata, Trilliums, Violets, Erythronium, Dentaria, Sanguinaria, May apple, Dutchman's Breeches and Squirrel corn. During the summer, woods with underbrush are not attractive, but with the coming of autumn there is a decided change. The foliage becomes more scanty and is taking on color, the fall flowers, mostly Compositae, appear in sunny spots, woodland borders and the flood plains. The dominant ones are Joe Pye, Boneset, Sneeze weed, Sunflowers, Vervain, Veronicas and Anemone canadensis. Occasionally you find colonies of the Mist flower (Eupatorium celestinum); it is attractive and suitable for garden use. We can hardly omit those two important shrubs, the prairie crabapple

THE DAINTY ANEMONE

This is a bit of lovely woodland, as yet unspoiled by pasturing. The pure white star flowers are sometimes tinged with blue.

WILD SWEET WILLIAM

This bit of unpastured woodland is now gay with wild phlox and May apples.

BLUE BELLS, OR MERTENSIA

This large colony of woods favorites developed in a clearing where the woods were cut the previous year. An early spring flower of the Middle West.

(Pyrus ioensis) and the thorns, Crataegus coccinea, molle, crus-galli, etc. They are so floriferous as to appear almost like large herbaceous plants. It is common to find a glade in the woodland with a solid border of crabs and haws. There are often fine specimens of individual haws scattered in the open area. When in full bloom the effect is very commanding and you feel as if some person had a hand in such a deliberate arrangement. Sometimes you will find in this region what might be called islands of trees. They may be from one to three acres in extent, consisting of an inpenetrable border of interlaced crabs and thorns with a central portion of taller trees. All of these materials have been widely used in landscape work.

It is hardly expected that many people will set aside tracts for the preservation of wild flowers, but we do hope that the growing interest in forestry will bring about that desirable condition.

Many wild flowers once plentiful are now very scarce. The people should give intelligent support to the preservation of desirable areas so that utility shall not wipe away from the prairie all of its beauties.

WHAT IS FORESTRY ALL ABOUT?

BY THE OBSERVANT STENOGRAPHER

(*Continued from page* 688)

make the conversations I hear in the office. One man says this, another that. They talk about developments and needs and conditions, and give me information, but nowhere do I seem to get anything to fill me with a proper crusader's zeal or make me feel that the forestry problem is my problem. Perhaps this is why neighbors do not discuss the subject with neighbors, or Mr. and Mrs. Average Citizen fret over the depletion and neglect of the forests. But this is not surprising since no reform movement I can think of, except prohibition, and no subject of national importance, save war and baseball, seem ever to have more than a minority hearing. Dr. Frank Crane recently said he was curious to know why people were interested in legislation for the future, when they would soon be dead. So it is with forestry. Put a tax on our ice cream soda, and we rise to object, but tell us our future timber supply is at stake, and we say "how come," and go down to the movies.

So while there is much I cannot expect to understand about this forestry business, and many things difficult to reconcile, I'm going to write down as my lesson up to date what I've gathered from here and there and particularly my version of what a forester has told me. On one point it is agreed that the first great principle and the foundation of all else is protection of the forests from fire. In this, every single individual who escapes from the confines of brick and stone and lights a fire in anything more dangerous than the kitchen stove should be made to help, the penalty for digression to be roasting in any grass, brush, or forest fire he starts.

With forest fires controlled, if the wise legislators, foresters, timber owners and dear public ever learn how, we should encourage new forests to grow up naturally where they have been cut or burned, giving them such help as we can. Then as fast and as far as practical the foresters should apply their art so as to make better trees and more of them. Some day they may even be given money to plant trees where the land is waste. In short, as Professor Roth told us in a recent article, we should keep every acre of forest land covered with growing timber. Well, why don't we?

We can save at the other end, too, by using all of a tree after we cut it down, and making every stick serve a useful purpose. Careful selection for the use intended and treatment against decay where necessary, will make the supply go much farther.

There are a lot of other things, including some sane legislation and cordial cooperation, but these are for the foresters and lumbermen to work out. They must get together before the public can be expected to back them up or pay the bill. As long as one group of foresters says: "We must have a forest policy which absolutely prohibits the cutting of timber save under government control," and another group sides with the lumbermen and says: "Our constitutional rights prevent interference with our private property, and anyway the cut-over lands will reforest themselves if fire is kept out," you cannot expect the outsider to take much interest. People don't care much for this "you're a liar" business.

When we can be told clearly "what it is all about," and made to feel that a forest policy is a vital, urgent necessity for our national well-being because those who know agree as to what we need and why, I'll be one of many to feel like going out and preaching from a soap box to the multitudes, or to even write to my congressman; but just now I'm luke-warm, and listening.

My Friends, the Trees

The oak is King of the forest;
  The birch is his Queen.
The pine is a sturdy squire
  In garment of green.

Pear and apple are peasants,
  Gnarled, old growers of fruit;
And the poplar is a gentleman
  From nodding head to root.

The aspen is an actress
  Who flirts with every breeze.
There are all sorts of characters
  Among my friends, the trees.

—Julian M. Drachman.

NATURE STUDY IN OUR PUBLIC SCHOOLS

BY DR. R. W. SHUFELDT

(Photographs of figures 5-9 by the author.)

ONE of two things can happen to a civilized people following upon a great world war; they may either become brutalized by the experience and sink into an age of decadence, barbarity, and lawlessness, or they may maintain their vigor and stability, and, with a firm determination to rebuild the shattered structure of their civilization, rise superior to the brutality and destruction in which they have been engaged. When the latter course is chosen there is no surer and more gratifying index of it than to see the people go back to nature for their refinement, inspiration and rebuilding. This is what has happened in this country, to a large extent; and it is a most encouraging symptom when such a movement manifests itself, as indicating the soundness of the brains, morals and physique of the people.

Chief among these indications is the taking up of the study of nature—not only here and there as a pastime, but by students all over the country, and by its introduction into universities and colleges and into private and public schools. At this writing the study of nature, as it has come to be incorporated into the curricula of our public schools, has been a movement taken on by our educators and others, and through their energy and encouragement has spread over the country as a great wave of enlightenment from one end of it to another.

FIG. 1. EDUCATIONAL MUSEUM BUILDING AT ST. LOUIS

The children composing a Nature Study Class are seen entering the main door with their teacher. Note the two large delivery trucks which are filled to their capacity twice daily.

Having been a working naturalist for many years, and having during the past year conducted nature study classes in the public schools of Washington and the regular summer course lectures upon the same subject at the George Washington University, I have become thoroughly interested in this country-wide movement. Then, in order to obtain a broader view of the situation, I wrote for information, plans, booklets and photographs, addressing my communications to the superintendents of our public schools in various cities of the United States. The responses have been most gratifying and encouraging. I have also been favored by the Bureau of Education of the Department of the Interior, it having supplied me with a number of their recent Bulletins on this subject. One of these, on the "Reorganization of Science in Secondary Schools," is of especial interest and importance as touching upon this matter. Here the work of what was being accomplished along such lines and for further recommendations was referred to a Science Committee, composed of teachers of biology, chemistry, physics and general science in the public schools and other schools located in various towns and cities all over the country. This report makes a pamphlet of over sixty pages, and includes, or embodies, the contributions and criticisms of more than fifty science teachers and administrative officers, approved by the reviewing committee of the Commission on the Reorganization of Secondary Education. Some of the suggestions set forth will be touched upon further on.

It would seem that a large number of the superintendents of our public schools issue these schemes on the elementary course in science, each after his own fashion. As a rule, they are neatly bound in heavy paper, frequently carrying many half-tone illustrations devoted to the children in the classes, to school museums, specimens used in teaching, and to numerous other features of interest. On an average, these pamphlets carry fifty or more pages of printed matter—in the case of one or two schools over a hundred; occasionally charts and diagrams are incorporated. Among the most elaborate of these publications are from the superintendents of the public schools

of New York City, the District of Columbia, Philadelphia, Pittsburgh, St. Louis, Indianapolis — other cities issuing less formal printed schemes. There seems to be a very fair consensus of opinion on the part of the framers of these courses with respect to the grading of the instruction in nature study for the several school grades; the time allowed for its teaching per school day; the material to be employed; the amount and character of the field work, and so on for other activities involved.

FIG. 2. MATERIAL USED FOR TRANSPORTING COLLECTIONS

These are the boxes, trays and jars used at the St. Louis Educational Museum in sending out what is required at the Nature Study recitations in the public schools of that city.

In a brief article like the present one, it will be quite out of the question to set forth the vast importance of nature study in our public schools, for its beneficial effects reach far into all lines of human activity. In an elementary way, it should be commenced in the first grade and, with increasing complexity and

FIG 3. A NATURE STUDY CLASS STUDYING JAPAN

Elementary ethnology is included in Nature Study in many of the schools. Note the fine series of birds and flower pictures arranged on the blackboards.

lengthened time limits, it should be carried, by trained and competent teachers, through all the grades to include the eighth.

There is no profession or calling in man's activity wherein a complete course in nature study will not be highly beneficial throughout life, in one way or another—that is, taken up as now given by the best teachers in our schools and the knowledge imparted in the proper way. Moreover, it links in with all the other studies set forth in the school curriculum—as literature, art, geography, arithmetic, manual training, language and civics. Through nature study man comes to comprehend his own position in the system, might lie dormant throughout a lifetime. This for the reason that making pictures of natural objects is part and parcel of a course in nature study—at least it should be.

Every public school where nature study is taught ought to establish and cultivate a school museum of natural objects, and both teachers and pupils should be instructed in the matter of sustaining it and have it grow; its proper uses should also be constantly instilled into the minds of the scholars.

There is no single one of the regular professions wherein nature study does not enter sooner or later, and in a great many cases it comes to be a daily hap-

FIG. 4. GROUNDS OF THE UNITED STATES BOTANIC GARDENS

An admirable place to explore for a class in Nature Study, especially to study the rare trees. Here we may note the *Cedrus libani* on the left, and on the right a wonderful specimen of the European hornbeam (*Carpinus betulus*). Mr. George W. Hess, the present superintendent, is seen in the foreground.

in nature, and in his environment. It makes for health in the field work; it trains the mind in the matter of correct observation in all things; it cultivates the aesthetic taste, and leads one to read many books of many kinds. Further, it inspires the student to acquire knowledge and to use it after its acquisition; it ennobles the best qualities in our nature, and puts to shame the baser ones; moreover, it cultivates an appreciation of art, and brings out artistic qualities that

pening depending upon the calling. It stands to reason that a biologist, an explorer, a zoological artist, and a forester, would each and all would more frequently be called upon to use knowledge of this class than would a lawyer, a physician, or a priest.

The range of nature study is enormous, as it covers a consideration of all contained in nature on the face of the globe; this quite apart from the artificial struc-

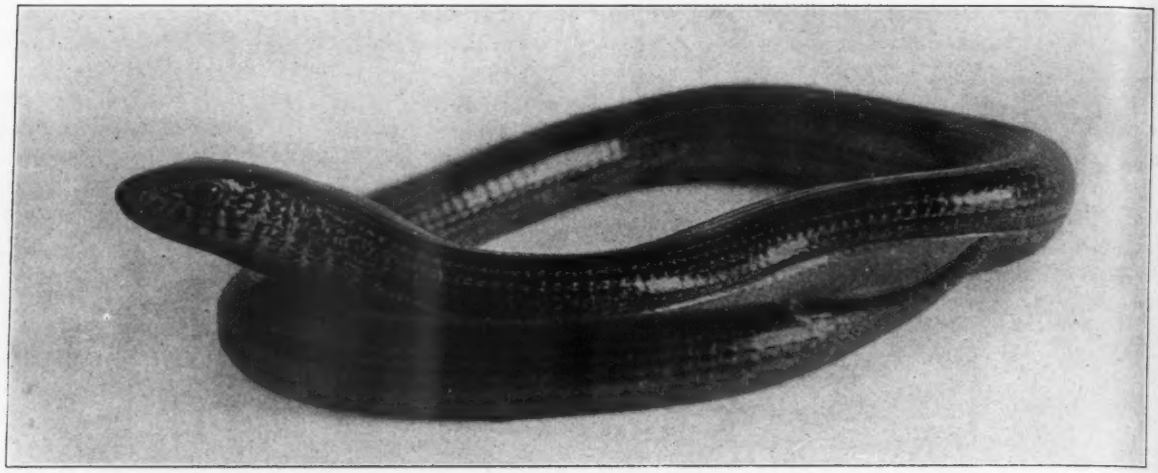


FIG. 5. LIVING SPECIMEN OF THE FAMOUS GLASS SNAKE

Excellent material to bring before a Nature Study Class; it is a limbless American lizard from Florida, and an entirely harmless one. To avoid capture, it frequently parts with its tail, which eventually grows out again; this has happened to the present specimen.

tures and arrangements found upon Earth as placed there by man—erected by him.

Where a city has its natural history museum; its well-equipped zoological garden; its botanical gardens; its nature laboratories, and its public aquaria, these are, each and all, of the greatest service to the teachers of nature study in the public schools of that city; and most American cities, containing the requisite populations to support such institutions, possess these adjuncts to civilization and progress.

In most of our public schools nature study and gardening, or elementary agriculture in its various departments, are more or less closely associated—indeed, the booklets that have been issued by the schools stand for this arrangement. The plan is an excellent one; but in this place only the readers' attention can be invited to the fact.

In a pamphlet of nearly seventy pages, Mr. Myron J. Walter, Director of the Department of Nature Study and School Gardens of Pittsburgh, Pennsylvania, presents a course of nature study most valuable and interesting, and Mr. William M. Davidson, Superintendent of the Schools of that city, says in his preface to that course that the material outlined will, of necessity, be correlated by the wise teacher "with the proper branches in the school curriculum, particularly Geography and Language." Excellent advice is presented by Mr. Walter on "The Field Trip; the Museum; the Aquarium; on Charts and Calendars; on Correlation; on The Teacher, on Preparation, Application, Time," and so on. The recommendations for the study of plants, flowers, seeds, trees, insects, birds, and mammals, could hardly be improved upon, and all these subjects are fitted to the various school grades. Here is an example. Under "Insects" for the fourth year we read: "Review carefully the life history of moths and butterflies, also the differences be-

FIG. 6. MANY MOTHS AND BUTTERFLIES TO STUDY

The well-known Luna moth from life, seen on side view. A Maryland specimen in the author's collection, and it is of a lovely pale green color.

tween moths and butterflies. Make a study of the life history of the Codling Moth, touching on the economic importance and methods of control. Make an intensive study of the life history of the house fly. Obtain literature from the Local or State Department of Health and distribute to the children. Dwell particularly upon the fly as a disease carrier; and methods of control."

Foresters will be especially interested in the fact that in all of the schemes, from all of the cities, particular attention is paid to the study of our fruit, shade and forest trees; and as a matter of fact, on pages 47 and 48 of this admirable outline of Mr. Walters', the study of the trees of the United States forests is given especial prominence, with very explicit instructions on nearly every phase of practical forestry. Animal life is taken up in the same systematic manner so that a child of good intelligence can not fail of having an excellent understanding of elementary biology along utilitarian lines upon completing the entire course in a Pittsburgh public school. More than ten pages are devoted to giving a list of the nature books on the various subjects taken up in the course; and this is an excellent idea, not to mention the great assistance such information is to the teacher. Since the above was published, Mr. William M. Davidson has issued (June 1, 1921), the new "Elementary Course in Science," prepared by Mr. John A. Hollinger, Director of the Department. Here the course is laid out in a most exhaustive manner, and the work is one of great value. At this point I may say that I sent out a questionaire to many of the school superintendents in different cities, receiving most interesting replies. Mr. Hollinger's answer goes to show the enthusiastic interest taken in the nature study course in the city of Pittsburgh by the community at large, by the teachers, and, as a rule, by the pupils. Among other things he says that the teachers "in nature study interest their classes to a high degree. Most of our teachers are enthusiastic and show considerable information concerning nature study. In addition, at least one-half of our schools or more have some specimens of one kind or another. Many schools have rather large cases of specimens pertaining to Biology and Botany.

"The community is very favorable and enthusiastic, as is indicated by our Nature Study Club; Naturalists' Club; Hiking Club, Botanical Society, Audubon Society and other smaller organizations."

In September, 1909, a somewhat similar pamphlet to the above, tastefully gotten up, was issued by Mr. A. T. Stuart, the then Superintendent of the Public Schools of the District of Columbia; but it is not nearly so thorough as that which we find in the works referred to in a previous paragraph; as a matter of fact, it stands much in need of elaboration. In most of the suggestions presented, they are less than a skeleton of what is demanded.

FIG. 7. CATERPILLAR OF THE LAUREL SPHINX MOTH (*Hyloicus kalmiae*).

Teachers aim to frequently bring before their nature classes specimens of the various caterpillars. This species feeds on the tomato and on other plants, and occurs from southern Canada to Georgia. Color, bright green with white markings.

From Indianapolis, Indiana, Mr. E. K. Ray writes me that their "Nature Study Course is undergoing completion;" and he was good enough to forward me a typewritten copy of what is soon to appear in the premises. It promises to be a very elaborate and valuable one, and is sure of contributing substantially to the literature of this subject.

In some cities, additional stimulation and more effective methods are much demanded along the lines here being considered; especially is this the case in such cities as New Haven and Chicago, and possibly others. Mr. George Wheeler, Acting Superintendent of Schools of the School District of Philadelphia, issues a booklet of some 119 pages for "The Course of Study in Geography and Nature Study in the Public Schools" of that city which is very thorough in treatment. The combination of nature study and geography is most admirable, not to say natural and necessary. In the "Foreword" to this brochure, Mr. Wheeler very truly remarks that "Geography is one of the great means by which we come to understand human life. It was formerly defined as a description of the surface of the Earth, and under that definition location was the most prominent aspect of the study. In later years the contents became much enriched by the

consideration of the characteristic flora, fauna, and peoples of the various regions, by a study of industry and commerce and of various physical phenomena. Still, however, the stress was laid upon description, and so long as this prevailed, geography could justly be called 'a composite of sciences' and not a true and separate branch of knowledge.

"As defined by modern education leaders in that study,

FIG. 8. GOLDENROD STUNG BY A PARASITE

Children can always be interested in such a specimen as is here shown, especially when the teacher explains how plants behave after having received certain injuries.

geography has a central idea of its own; that basic idea is the factor of relationship between the Earth upon which we live and the life which is lived upon the Earth. We may study on one hand the physical factors of situation, climate, topography and natural resources of a region; on the other hand the plant, lower animal, and human life which occurs in that region; yet we have not attained to true geography until we have discerned, in part at least, how the life which we describe is shaped and directed by the physical conditions of its environment. * * * Nature Study, beside being in itself a desirable portion of our curriculum, is also an essential preliminary to geography. The knowledge which is gained through nature study, the habit of observation which it fosters, the love of the beauty and plan of the great outdoors, are all valuable for sane and complete living, and are also indispensable to a satisfactory basis for geographic thought.

"The value of geographic study was amply proved during the World War; a study of true geography is even more necessary in peace, as the economic relations of the world again approach normal conditions."

Too much cannot be said in favor of the valuable booklet Mr. Wheeler has added to the literature of this subject; indeed, it is a masterpiece in its treatment, highly indicative of American enterprise and advanced thought.

The Elementary Schools of the City of New York also has a wonderfully fine treatise on a "Course of Study in Nature and Environment," as adopted by the Board of Education on the 26th of June, 1918, and by the city's Board of Superintendents on the 18th day of May, 1920. It is entitled "A Syllabus in Nature and Environment," and treats the subject thoroughly and satisfactorily.

On the 8th of June, 1921, Mr. Eugene A. Nifenecker,

FIG. 9. A FIELD STUDY FOR THE CLASS

Here a common Pasture Thistle stands out in the clear; the class may assemble about it, the teacher telling them the story of its growth, its place in classification, how its seeds are distributed, and what insects visit it.

Director of Reference, Research, and Stastistics of New York City and a member of the Board of Education, sent me a most interesting and valuable letter on this

subject. Many years ago, when I was living in New York City, I remember the large classes of public school children that visited the Aquarium at Battery Place, and the great pains the director of that institution, Doctor Townsend, and the late Mr. Spencer, took in demonstrating to those classes the lives of the fishes, and the theory of balanced aquaria. From Mr. Nifenecker's letter we learn that every possible advantage is given the children of the public schools of New York City to receive instruction in nature study, and to supplement that study by "visits to the museums, parks, and other places of interest." There are also well sustained Nature Rooms in the public schools of New York City; and, as a rule, the intelligent American part of the population is strongly in favor of maintaining the nature study course in the curriculum.

FIG. 10. NATURE STUDY ON THE PACIFIC COAST

Mr. Carroll De Wilton Scott, of San Diego, California, supplied the four photographs here shown. Upper: Natural History Museum Buildings, Balboa Park, San Diego, Cal. Below, to the left; Second Grade, Franklin School (mostly Mexicans), at the Natural History Museum in May, 1921. Right: Fifth Grade, Sherman School, at the Natural History Museum, May, 1921. Below: Fourth Grade, Francis Parker School, San Diego. Ready to visit the Museum, May, 1920. Mr. Carroll De Wilton Scott in the background.

Judging from the material I have at hand on this subject—and it is quite extensive—it would appear that the public school system, in the matter of nature study, is, as organized in the city of St. Louis, far and away ahead of any other city in this country. And for the information on that point; for the fine photographs sent, and for the literature on the subject, I am indebted to Mr. F. L. Wiley, Assistant to the Superintendent of those schools, and to Miss Amelia Meissner, Curator of the Educational Museum of the St. Louis Public Schools. Mr. Wiley writes me, among other things, that "the St. Louis Public Schools maintain an educational museum, with delivery service to all the schools. We therefore do not have individual school museums" (May 31, 1921); and Miss Meissner writes, "we like to stress the idea that our object is to bring the museum to the schoolroom rather than have the school child brought to the museum." In the case of non-transportable material, the classes are brought to the museum. The St. Louis Department of Instruction separately publishes the "Public School Messenger" for the information of teachers and pupils; this is now in its seventeenth volume, and is replete with all that pertains to the course in nature study in the schools in question; they also publish a brief on the "Educational Museum of the St. Louis Public Schools," which is by the way, a separate building, of ample proportions for the purpose outlined. This brief is a most remarkable little print of four pages, and sets forth the great advantage to be gained by having "a museum on wheels." This museum also has a library of 10,000 volumes. Every

public school teacher in the city of St. Louis has a catalogue of this library at hand, and by 'phoning for any particular book, he or she may have it delivered at once by automobile. The "Record of Delivery" of specimens to the city schools, by the same prompt plan, shows that during the years 1914-15 there was thus delivered 72,173 specimens, the same being returned to the museum building after the class demonstrations. The institution is financially very strong ($11,709.52), while the annual expense per pupil is but 0.14¾.

The number of the individual collections in the museum is 1750, and 7000 individual and duplicate collections constitute the traveling museum. The number of lantern slides is 4000; stereoscopes 8000, colored charts and photographs 2000.

In the case of the "traveling museum," the material "is sent to the schools by a large automobile truck in the service of the museum. The schools are divided into five sections, each of which has a delivery day once a week. The principal of a school which has its delivery day on Monday asks his teachers on the preceding Friday to send him the numbers of all the collections in the museum catalogue they will need for the illustrations of their lectures during the following week. These numbers he inserts in an order blank for the curator, and on the following Monday the wagon delivers the material at the school, taking back at the same time the collections used during the previous week."

There are printed instructions how to best use this material, also a beautifully illustrated catalogue of the collection in the museum building. Other helpful and most excellent booklets and pamphlets are issued, and the entire system is certainly a most extensive and efficient one.

The District of Columbia, it would seem, could, in time, easily follow the St. Louis plan as above outlined; for it must have, in its various Federal museums, a perfect mass of duplicate material along every line required by the nature study teachers in the public schools of the Nation's Capital. It would seem, too, that it might be a good plan to utilize some of this material in this way, and thus throw a little life into what is now largely dead timber.

In New Brunswick, during 1920, there were 312 forest fires from all causes, burning over 94,787 acres, and representing a monetary loss of $690,306.

DIFFERENCE BETWEEN MODERN RANGER AND PIONEER

Ex-Forest Ranger Robinson was recently quoted in one of the San Francisco papers as follows:

"Fellow named Robinson, who is in the Forest Service up Sonora way, postcards down that the only difference between the modern ranger and the pioneers is that while the latter blazed the trails, the former trails the blazes."

OAK AND ELM FORM REMARKABLE TWIN TREE

BY ROBERT H. MOULTON

WHAT may be called the "Siamese twins" of the tree world is found on an island, formed by two branches of the Mississippi River, at Rock Island, Illinois. The island in question, which is occupied by an arsenal of the United States Government, embraces some two hundred acres of luxuriant forest, comprising many varieties of trees, and almost in the center of it is the twin tree, an oak and an elm, the trunks of which having grown close together many years ago appear to be merged into a single bole to a height of five or six feet. At this height the trunks are entirely separate, each bearing its

THE "SIAMESE-TWIN" TREES

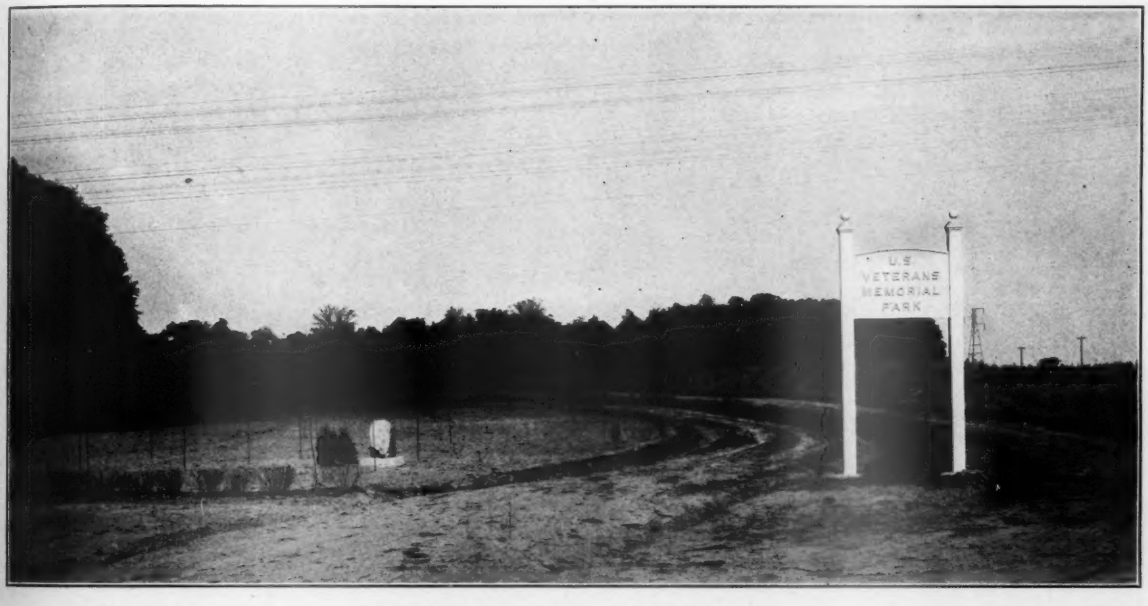
own peculiar bark formation and foliage. However, throughout the line of apparent merging into one trunk there is a clearly discernible line of demarcation between oak and elm, this being readily seen in the different sorts of bark. Apparently the trees were growing side by side when saplings. The twin tree has been estimated to be a hundred years old but is still of vigorous growth. It may have been noted by the Indians who once camped on the island, and it is even possible that the people had something to do, either by accident or design, with the remarkable formation.

CHARLOTTE PLANTS MEMORIAL PARK FOR VETERANS

CHARLOTTE, MICHIGAN, has turned eighteen acres of unused land into a memorial park, and has set a fine example to other towns. In this park is a boulder, around which have been planted thirty-three gold star trees for the men of Eaton County. There are winding roads and shrub-lined paths that make a beauty spot. Charlotte thus tries to show to the world the glory of those who fought for her in the World War. She will not parade her mourning for that is a private affair with the individual. In this plot, known as the United States Veterals' Memorial Park, Mayor George M. Fenn, Sr., informs the association that seven thousand seven-year-old white pines have been planted. Then, too, there are a thousand hardwood trees, mostly maple and elm. Scattered about are one hundred butternuts and one hundred black walnuts. The roads in the park are lined with tomorrow. Charlotte has placed before her future citizens and the world a memorial well worth while.

One of the last public acts of Col. F. W. Galbraith, Jr., commander of the American Legion, before he was killed in an automobile accident, was the planting of memorial trees at the intersection of the Dixie and the National Highway at Vandalia, Ohio. The planting of the memorial trees was a part of America Day program in which Col. Galbraith had made a rousing Americanization speech.

Fifteen American elms were placed. This step signifies Dayton's cooperation in the campaign launched by the American Forestry Association to beautify the highways with trees. Tributes to the "unknown dead," to the fallen soldiers, sailors and marines were expressed in



Photograph by Roehm GOOD EXAMPLE SET BY CHARLOTTE

What was once a tract of land that nobody bragged about is now a beautiful memorial park. The work was done by the pupils of the schools and the citizens of Charlotte. The American Legion had a big part in the ceremony and Mayor Geo. M. Fenn, Sr., was one of the speakers. In the tract seven thousand seven-year-old white pines, one thousand hardwood trees, maple and elm, one hundred black walnuts, one hundred butternut trees and a grove of red oaks were placed. In the center of the red oak grove is a memorial stone in honor of the men from Eaton County who did not come back after answering their country's call to the World War. There are thirty three of these memorial trees which Mayor Fenn has registered on the national honor roll of the American Forestry Association. The roadways through the park have been laid out and lined with varieties of shrubbery while a hedge runs along the side of the park, which adjoins the main street of the town. In the years to come Charlotte will have a memorial she will be proud of, for it is one in the creation of which all her citizens had a part.

honeysuckle, lilacs, the flowering quince and other varieties. The city of Charlotte has done well, much better than by the erection of a stone shaft. Here Charlotte sees the consummation of community endeavor, for it was the community that did the work. Here each year Charlotte can rededicate herself to the ideals for which her sons fought. Here Charlotte can gather and take up any question of community endeavor. Her work has just begun. The children and the young men of the American Legion and other organizations, that had part in the park dedication, will be the citizens and the veterans of the four trees representing the Dayton branch of the American Forestry Association. A fifth, offered by the Burroughs Nature Study Club, was dedicated to the memory of nurses.

Uniformed troops of Boy and Girl Scouts were present at the ceremonies, in which the Dayton Federation of Women's Clubs, the Horticultural Society, Rotary and Kiwanis Clubs, Advance Club, Woman's Press Club, Council of Jewish Women, the Aurean and Geographical Societies of Steele High School and Vandalia were represented.

Exercises centered around the tree dedicated to the "unknown dead", the first to be planted. Arrangements for the day were in charge of Clarence O. Siebenthaler. An address by Prof. William A. Werthner was followed by an invocation. Mayor Pease gave the greetings from

Maywood and Howard

COL. GALBRAITH PLANTS MEMORIAL TREES

Col. Galbraith is the man in the overcoat, speaking at the memorial tree planting at Vandalia, Ohio.

Vandalia. Colonel Galbraith gave the main address. He was followed by S. S. King, who spoke for the Forestry Association, and by Miss Irma Gerkins, who represented the women of the country. A few moments of silent prayer and the singing of "America" concluded the program.

THE SUCCESSFUL WOODLOT

IN order to make a real success of the farm woodlot it is necessary to know what trees to plant and how to grow them. Many plantings of trees have turned out failures because of the selection of species unsuited either to the climate or to the soil. The best trees for planting on a home farm usually are those which grow well in similar soils in the region, according to the recommendation of forest specialists of the United States Department of Agriculture, in Farmers' Bulletin 1123, "Growing and Planting Hardwood Seedlings on the Farm," which may be had by application to the Department.

In determining what species of hardwood trees should be grown, the bulletin says the object of growing the trees and their adaptability to the climate of the region should be kept in mind. As an illustration, boxelder is not a good tree to plant for timber; the yellow poplar, because of climatic conditions, can not be grown successfully in the plains region of the central United States, and hardy catalpa will not thrive in poor, sandy, or heavy clay soils.

To a certain extent trees may be grouped as those most valuable for lumber, for posts and poles, for windbreaks, etc. Some of the varieties listed as suitable for lumber are: Ash, basswood, beech, birch, black cherry, cottonwood, cucumber, elm, hickory, sugar maple, red oak, white oak, red gum, sycamore, black walnut, and yellow poplar. Varieties suitable for posts and poles are: Hardy catalpa,, coffee tree, red elm, eucalyptus, black locust, honey locust, Russian mulberry, oaks, osage orange and white willow. Varieties best suited for windbreaks are: Green ash, boxelder, cottonwood, eucalyptus, hackberry, silver maple, Russian mulberry, osage orange, Russian olive, white willow and yellow willow.

A mixture of two or more kinds of trees in a plantation sometimes is desirable, says the bulletin. For best results, trees such as the cottonwood should be spaced widely, while others, such as black walnut and black locust, have such scant foliage that their shade does not prevent the growth of a heavy sod. A mixed planting of cottonwood with either of the other two varieties mentioned will more completely utilize the ground, increase the yield, and bring about a better forest condition. Frequently, less expensive and less valuable varieties can be planted as fillers with trees that are to make up the permanent planting. Mixed plantings also are desirable as a protection against diseases and insect attack.

Unless intended for windbreaks, plantations should be located on the poorest soil of the farm, that least suited to the production of agricultural crops. Odd corners cut off by streams or driveways and hillsides or poorly drained soil should be selected. In starting a grove, seedlings one or two years old are preferable to seed or cuttings. Nut trees, such as walnut, hickory, and oak, develop a deep taproot and few lateral feeding roots during their first year. They can not, therefore, be transplanted as successfully as other trees. The nuts or acorns should be planted on the permanent site. Sometimes it is advisable to sprout the nuts before this planting is made. Cottonwood and willow plantations are most easily started with cuttings—12 to 14-inch sections taken from one or two-year-old twigs of living trees. Cuttings should be collected during early winter and buried in moist sand in a cool place preparatory to planting in the spring.

In general, early spring planting is preferable to planting at any other season. As compared with fall planting, it has at least two distinct advantages—the stock has an entire growing season in which to become established before it is subjected to the rigors of winter, and it is not in immediate danger of being heaved out of the ground by alternate freezing and thawing.

MAHOGANY

(*Continued from page 710*)

convenient lengths to be handled and squared so that they can be more easily stowed away in ships.

By this time the dry season has begun, and while a part of the gang are engaged in cutting,, others are at work preparing roads and bridges to enable the logs to be transported. The trucks used for hauling are two-wheeled affairs, constructed on the spot, save for the axles and hubs, which are brought in by the lumbermen. Oxen are used to haul these improvised wagons. The work is done mostly at night, by the aid of pine torches, for the reason that it is cooler at that time. The logs are collected on the banks of the rivers and left there until June, when the rainy season sets in. At that time they are cut loose and allowed to float down stream. A gang of natives in flat bottomed canoes follow the logs to see that none are lost. When they have arrived at their destination, each owner collects his logs, which are marked by certain distinguishing marks on the ends. They are then prepared for export by cutting off any battered ends or split portions. The natives tie them together and raft them to the ships, where they are placed aboard. This is a dangerous operation, for in rough weather, many of the rafts are broken up and the timbers carried out to sea. In the majority of cases they are carried by ships to London, which is the mahogany center of the world, and from there dispersed in smaller quantities.

The wood is generally classified under two heads: the Spanish Mahogany and the Honduras mahogany. The former composes the richly colored, solid, heavy varieties, which are sought after chiefly for furniture veneering. It is susceptible to a high degree of polish and when properly treated, a rich wavy figuring is brought out. The Spanish wood is the produce of the island of San Domingo, whence only small quantities come at the present time. Cuba furnishes a much larger log, which is only slightly inferior to the San Domingo, and is classed as Spanish wood. It can be partly distinguished by the white chalk-like specks in the pores and is cold to the touch.

The Honduras mahogany is lighter, open grained and more uniform in color; almost devoid of figuring or curl. There are black specks or lines in the grain, which are characteristic only of that variety. It is valuable where a sound straight timber free from all tendencies to warp is required. Alkalies are often applied to this, especially to the lighter colored wood, in order to deepen the shade, and in this way it sometimes replaces the better grade of wood.

The logs are often forty feet long and from two to three feet square. They are obtained from the low, moist land and are generally soft and coarse. This variety is used as a foundation on which to veneer the finer varieties, and from its spongy nature it is admirably suited for this purpose, for the reason that the pores aid the glue in adhering. Aside from this, it finds a large use in pattern making, small turning work and shipbuilding. The trees growing in the North, near the Mexican border are much more dense and solid than the lowland timber.

Some authorities have supposed the Honduras to be a different species from the Spanish because of its lighter color as well as the porous texture; but it is now believed that these differences arise from the different situations in which the trees are found.

In Mexico, the mahogany tree attains its greatest dimensions. Squared logs of from forty to forty-eight inches are infrequently obtained, although the average are from fifteen inches to three feet, cut in lengths of from eighteen to thirty feet for convenience in shipping. The wood in general is plain and somewhat soft at the core, resembling the swamp variety of the Honduras wood, and although timber grown on the upland provinces, especially Tobasco, is firm, solid, and not unfrequently richly figured.

A carpenter on Sir Walter Raleigh's ship is credited as being the first person to have noticed the superior qualities of the wood. He was attracted to it because of its great beauty, hardness and durability. Dr. Gibbons, a physician of London, in 1720, was presented with several planks brought from the West Indies. He employed a cabinet-maker named Wallaston, to construct some small articles from this wood, and dating from that time it has been highly cherished as a cabinet wood, due to its soundness, large size, uniform grain, durability, beauty of color, richness of figure, which is improved by age, and the ability to take a high polish.

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Any person may become a member of the American Forestry Association upon application and payment of dues.

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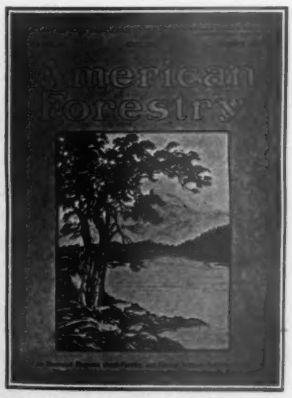

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PRESIDENT ACCEPTS MUIR WOODS

On September 22, President Harding by public proclamation accepted and added to the present Muir Woods National Monument, California, 128.14 acres of land, gift to the United States from former Congressman and Mrs. Wm. Kent of California and from the Muir Woods and Mt. Tamalpais Railroad. This is probably the first instance on record of a railroad deeding lands to the United States as a gift. The Muir Woods, a notable grove of redwood trees, (*Sequoia sempervirens*) became the property of the United States on June 9, 1908, when former President Roosevelt accepted 295 acres from Mr. and Mrs. Kent and proclaimed the area a national monument. Located on the south slope of Mt. Tamalpais about seven miles in a direct line across the bay from San Francisco, it contains numerous redwood trees, reaching to a height of 300 feet and having a diameter at their base of 18 or more feet. The area affords recreation and pleasure to thousands of persons living in San Francisco Bay section and is visited by persons from every section of the United States.

HALL OF FAME FOR TREES

(Continued from page 712)

8. One hundred and fifteen years ago this year the Lewis and Clarke expedition camped beneath this Council Oak, nominated for a place in the Hall of Fame of the American Forestry Association of Washington by Mrs. Susie Brown of Marion, Iowa. This great burr oak is at Sioux City, Iowa, and experts say it was 150 years old when Lewis and Clarke saw it on their way to the Pacific Coast and there held council with the Indians.

9. This oak, planted to mark a signing of a treaty of peace with the Indians, is nominated by Charles A. Ingraham of Cambridge, New York. The tree was planted in 1676 by Sir Edmund Andros, Colonial Governor of the Province of New York. The planting confirmed the signing of a treaty with the Schaghticoke and other Indian tribes. The Governor was accompanied by a body of the King's militia and many eminent men in the affairs of the colony. In the party were a thousand warriors, and the ceremony was the most imposing ever held in the Hoosac Valley. After the Indians left to dwell at St. Regis, in Canada, Queen Esther came annually with her Schaghticoke warriors to the former hunting grounds, where they danced about this "Tree of Peace" and placed flowers on the graves of their warriors. This tree, on the Knickerbocker homestead at Schaghticoke, has a girth of 18 feet at a distance of three feet above the ground.

RED SNOW IN THE ROCKIES

Red snow which has made its appearance in many sections of the Rocky Mountain National Park this summer has attracted wide attention from the thousands of tourists who have visited this national playground, says an official bulletin.

The red snow is seen to the best advantage during the motor drive over the new Fall River Road which crosses the Continental divide reaching an elevation of over 11,700 feet above sea level. Many are the explanations offered by tourists and those who have seen the snow at about twilight stoutly maintain that its pinkish color is due merely to the reflection of the setting sun.

Knowledge of the real cause adds interest to this curious phenomenon. The great masses of color which appear in the large snow fields in the higher elevations result from countless billions of tiny organisms, which have the power of movement, growth and reproduction; a microscopic plant, (*Protococcus nivalis.*) Like many other low forms of life this one has characteristics of both the animal and vegetable kingdom, and belongs strictly speaking to neither.

A close inspection discloses that the color is concentrated in the hollows of the

furrowed surface of the snow, and reaches its maximum density about one-quarter inch below the surface. A slight scraping will produce in some places streaks of almost blood red. On the tongue its flavor suggests watermelon. A handful of snow, taken up and allowed to melt away will leave a powdery red stain.

Essentially an Artic species, *Protococcus nivalis* has introduced itself into the United States within the past decade. It is now found in Glacier and Mount Rainier National Parks. So far as known it has not been reported in other sections of Colorado. It is somewhat of a mystery how the spore is carried over such great distances. Possibly it is borne on the Chinook winds.

FREIGHT ON LUMBER.

The New York State College of Forestry referring to a statement made by Colonel William B. Greeley, chief forester of the United States, that it now costs Chicago $22,500,000 more a year for freight on lumber than it did thirty years ago, inquires thirty years hence what will freight on lumber cost Chicago? If it costs the windy city such an enormous sum a thousand miles nearer the supply, what will it cost New York in another generation? The country's annual freight bill on lumber is now $200,000,000 and when the southern timber supply is exhausted, as it will be at the present rate of consumption in eight or ten years, the entire nation will have to obtain lumber from the Pacific coast states, Oregon, Washington and California. It is estimated that the annual freight bill for the nation will have increased about 400% at that time, in other words, the people of this country will be paying $800,000,000 for freight on lumber.

HOW TO TELL BIRCH, BEECH AND MAPLE APART

BIRCH, beech and maple are very similar in appearance and have approximately the same weight. Hence it is comparatively easy to mistake one of them for another. A method which anyone can use to distinguish them is suggested by the United States Forest Products Laboratory. The method makes use of the relative width of the pores and medullary rays in the three woods.

If the end grain of birch, beech or maple is cut smooth with a sharp knife and examined with a hand lens, the pores will be seen as tiny holes distributed fairly evenly over the surface, and the medullary rays will appear as narrow lines of a different shade running at right angles to the growth rings.

In beech some of the rays are very distinct even without a lens. The large rays are fully twice as wide as the largest pores.

In maple the rays are less distinct, and are considerably larger than the pores in the largest are about the same width as the largest pores.

In birch the rays are very fine, invisible without a lens. The pores are several times larger than the rays, usually being visible to the unaided eye as minute holes on the end grain and as fine grooves on dressed faces of the board. The pores in birch are considerably larger than the pores in beech or maple.

The appearance of the medullary rays on a "quartered" surface is also distinctive. Here they appear in beech as distinct "flakes," the largest being between one-sixteenth and one-eighth inch in height when measured along the grain of the wood. In maple they are considerably smaller, rarely attaining a height of one-sixteenth of an inch. In birch they are comparatively inconspicuous.

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"THE FOREST PRESERVES OF COOK COUNTY"—This valuable report of activities on and administration of this wonderful tract, owned by the Forest Preserve District of Cook County, Illinois, is a splendid tribute to the men responsible for the development of this highly important public service work. The people of Illinois have good cause for pride in the possession of this forest preserve, for the wise foresight and public spirit which made its acquirement possible, and for congratulation on the sane and practical manner in which the project is being developed.

"LONG LIFE FOR WOOD" and HOW TO MAKE FARM TIMBERS ROT-PROOF"—two Carbosota booklets just off the press, are full of valuable information. The first describes the many uses to which Carbosota may be put, explaining the several methods of its application. The second points out to the farmer how he can save his buildings and all wooden structures from decay, describing and illustrating what rot of wood really is and how he may protect himself against it.

The California State Board of Forestry has acquired 30 acres of land on which they are raising trees for highway planting.

BOOK REVIEWS

Material Handling Cyclopedia (New York) $10.00.

This is the latest addition to the library of transportation literature, and its purpose is to bring together in a single volume complete and practical working information about the many types of material-handling devices used in industry. Its publication, instigated by the engineering departments of various material-handling machinery manufacturers and of terminal and industrial engineers, will fill a long felt want in providing in readily accessible form all information available on material-handling machinery and methods, which heretofore has had to be sought from various sources.

"The Spell of the Rockies," by Enos A. Mills, Houghton-Mifflin Company, is just what its name implies. The author deals with his experiences in camp, on trail, in the forest and on the mountains of the West, narrating what he has to tell in a manner both interesting and instructive. Few writers are as well informed about western conditions as Mr. Mills and it is always a treat to read his books.

"The Story of a Thousand-Year Pine", by Enos A. Mills, Houghton-Mifflin Company, is a booklet telling with charm and grace the life story of a yellow pine in one of the Western forests.

"The Conservation of Wild Life in Canada," by C. Gordon Hewitt D. Sc., Charles Scribners Sons. Declaring that on the American continent it is only in Canada that any important part of the original wild life remains Mr. Hewitt proceeds to make a survey of the wild life together with an earnest and compelling plea for concerted action in the endeavor to conserve and preserve our fast disappearing wild creatures.

"Manual of the Trees of North America," by Charles Sprague Sargent. Illustrated, $12.50.

A new, thoroughly revised and enlarged edition of this standard work on the trees of North America, with nearly 800 illustrations. "One of the fundamental books, and admirable in every way. It is the book that every tree lover must have. It tells him all he wants to know and nothing that he must unlearn."

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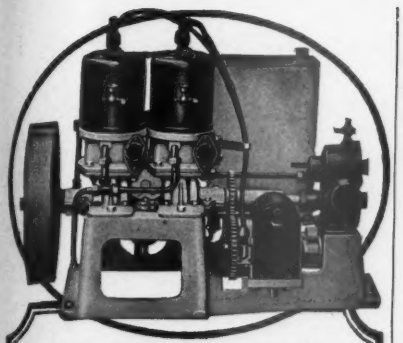

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FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.35
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	3.10
CHEMISTRY OF PULP AND PAPER MAKING—By Edwin Sutermeister	6.10
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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PAST PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

The progress being made toward practical and rational management of the Government forests in Canada is most gratifying. It is however only in its embryonic stage and much work needs to be done. Of course the first and most important thing is fire protection and this is receiving more and more attention. Five years ago a summer like the past would have caused enormous destruction, but in spite of the weather and the numerous fires the loss of valuable timber was not large, Much has been done during the past season by airplanes, not only in locating and reporting fires but also in carrying men to put them out. Aerial work will certainly increase in importance and value very rapidly in this country owing to the great extent of forests and the very meagre means of communication.

The second great need is for an inventory of our forest resources. We must know where the northern limit of merchantable timber is and also the eastern. Offerings of timber properties in Labrador are from time to time coming on the market and there seems to be no reliable information as to whether there is any timber there or no. Some reports say that there is enormous wealth and others that there is timber only on the rivers and surrounding the lakes and that the hills are quite bare. Many people when they hear of the rapid depletion of our forests turn over in bed with the comforting thought that we shall only have to go a little farther north to get all we need and want. We must know the areas which have been burnt over and whether they are being naturally reforested or not. The areas already cut over must be mapped and the probabilities of a new crop ascertained. It seems fairly certain that one third of the original forests of Canada have been burnt, that is, are not now covered with merchantable timber, or with timber that will be merchantable in a generation. Here again the airplane is doing yeoman service and it is only by its help that we can get the above information in time to influence our legislators to the necessity of making long time plans for the proper use of the forests.

Knowing approximately the amount of timber which we have and the annual consumption we can at once bring the whole forestry problem from the realm of opinion and conjecture down to the basis of fact and business necessity. Knowing how many acres of merchantable timber we have, how much is cut-over, how much is burnt, and about how much is likely to be burnt each year, and knowing the annual consumption we can say that we will not reach the end of our supply for a century. In which case the lumbermen and the general lumber using public can do the worrying. If however, it appears that our supply will be exhausted in fifty years or less then the pulp and paper manufacturers and the newspapers will begin to get excited and there will be not only fireworks but constructive action. Fortunately since the majority of timber lands in Canada belong to the Provinces each one of these has only to say, "Gentlemen, you are using our timber faster than it grows, we must reduce your allowance." There will be no question of "mandatory" legislation or invasion of property rights. In Canada, a very large amount of revenue in several of the Provinces comes directly from the sale of stumpage and a decrease in the amount of timber cut means a decrease in revenue and a consequent increase in taxation. The question is vital and comes home to every citizen. Therefore the question is, if we have only timber enough for fifty years, what are we going to do about it, not fifty years from now, but at once? What is the proper, business-like and commonsense way to handle the problem? In Europe it has been abundantly proved that you must spend money on your forests if you want to increase your revenue, just as you do on a farm or in a manufacturing plant. You must get the largest possible amount of timber from each acre. Many people seem to think that because a pulp or paper company has large timber limits, several thousand square miles, that they are in a strong position and have plenty of raw material for the future. This does not follow. There may be large burnt areas, large areas of swamp or water, it is a case where timber per acre is the important point. It does not take a financial genius to understand that it is better to have one square mile of land carrying 20 cords of merchantable timber to the acre within fifty miles of the mill than to have seven square miles carrying three cords of merchantable timber one hundred and fifty to three hundred miles away. There seems to be an idea that it is better business to have large areas of poor timber several hundred miles away from a mill than to take care of future requirements by planting right at the back door of the mill. Our Governments are at present selling the right to cut timber with practically no regulations which will insure the future productivity of the forest and with absolutely no regulations which will improve its condition or keep it on a basis of sustained yield. The amounts spent on

fire protection and inspection are ridiculously small. No planting on a really commercial scale is being done. They are living on our capital. However signs are not wanting of a public awakening, brought about in large part by the far-sighted self interest of the pulp and paper industry. Their position is that they have an obligation to their stockholders to keep the plants running, to the region, to see that towns and country districts which have been developed as a result of the establishment of their plants, do not go the way of the saw-mill towns of Pennsylvania and the Lake States, and to the Provinces which by the lease of water-powers and timber limits make their existence possible. After all true patriotism is good business.

The Forestry Branch News Letter, No. 194, issued by the Dominion Government is an interesting and well gotten up sheet and shows the attitude now being taken by the Dominion and Provinces of getting the people at large interested in public questions. The people must become interested in the people's business and once their interest is aroused progress will be rapid. The Government of Ontario is doing the same thing by carefully prepared matter issued to the newspapers giving the public information and instruction in forest fire protection and tree planting.

A new form of "Shanty-book" has just been issued for the Quebec Department of Lands and Forests. A "Shanty-book" is a book which is issued to jobbers working on Crown Lands, in which they are required to enter the number of logs cut each day. Each time the scaler measures the logs cut he must copy his record into the "Shanty-book" and this must be open at all times for inspection by the Forest-Ranger. The regulations governing the cutting of timber are printed in the front of the book and the penalties for infractions with them in red. Information as to the general value of the forests to the public are set out on the inside front cover, together with advice as to avoiding forest fires and the reasons for not wasting timber. Forms for affidavits of those using the book are included and on the back is printed a poem by Andre Theuriet called the "Benefits of the Forest".

Mr. C. E. Lane-Poole Chief Forester of Western Australia, has finally received authority to go ahead with the establishment of a forestry school for men wishing to enter the forest service. There will be a school in the central region of the forested area for apprentices under the control of a higher grade instructional officer. The course will cover four years and will combine theoretical and practical work, four to six months being spent on theory and the rest of the year the students will be attached to assistant foresters for instruction in practical work. During the training the students will receive wages and at the end of the course those who pass the examinations will enter the service as forest guards and will work up to Assistant-Forester and then to Forester.

The cooperative work on Forest Investigation at Lake Edward, under the direction of Mr. Robertson, for the Dominion Forestry Branch and the Laurentide Company is now under way. Sample plots are being measured again and in some areas of natural reproduction where the spruce and fir have come in very thickly and have reached a height of four to ten feet, plots of one to two acres in extent have been laid out and the trees thinned out so that they will stand four feet by four feet and eight feet by eight feet. The influence of this thinning will be studied with natural plots as controls.

CONFERENCE IN WASHINGTON

A Forestry Conference was held in Seattle, Friday, October 21st, the purpose of which was to lay the foundations for a sound state forestry policy for the State of Washington. It was conducted under the auspices of the State Development Bureau of the Seattle Chamber of Commerce and Commercial Club and was presided over by Dean Hugo Winkenwerder of the University of Washington. An interesting program of addresses and discussions filled the day and the Conference ended with a dinner in the evening. The enthusiasm and interest aroused during the sessions argue well for the future of forestry in the State.

INTERESTING REDWOOD NOTES

Mr. C. A. Reed of Santa Cruz, California, sends the following interesting observations concerning two redwood trees (*Sequoia sempervirens*) cut on the old Grover ranch between Soquel and Aptos Santa Cruz County. The two trees were three and four feet in diameter respectively and on one he counted seventy-eight rings and on the other ninety-three. Instead of the inner rings being wider and the outer narrower as has been the case on all other trees where he has counted the rings, the inner rings of these two trees were not over one sixteenth of an inch wide and the trees showed very little growth until they were forty or fifty years old. From that time on the growth was rapid and the outer rings showed an annual growth of one fourth to three eighths of an inch. These two trees had come from seeds and not from sprouts surrounding a tree that had been cut as had been the case with the other trees on which he counted the rings, so the inference is that it took them forty or fifty years to overcome an unfavorable environment and get a good start.

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GEORGIA FORESTRY COMMISSION BUSY

This Commission, created at the last session of the Legislature, has begun activities, looking to the conservation of Georgia's forest resources, in earnest. Though no appropriation was made available for its work, voluntary contributions from enthusiastic citizens have made it possible to go ahead. C. B. Harmon, secretary of the commission, points out that unless immediate action is taken to preserve the present timber and protect the young trees already growing, all Georgia lumber will have to be imported at high prices, made higher with the freight rates.

The Legislature authorized the appointment of an investigative committee to report on forestry conditions in the state, and the Governor appointed J. H. Mills, of Jackson, representing the farming interests; E. M. Thorpe, of Townsend, of the pine belt; Mrs. Robert Berner, of Macon, a prominent club woman; Bonnell H. Stone, Blairsville, hardwood section; M. L. Brittain, State School Superintendent; J. Phil Campbell, Athens, Director of Extension; L. W. McCalla, State Geologist and Mrs. Lollie Belle Wylie, Publicity Chairman.

An ambitious program already mapped out by the Commission includes the circulation of literature to every citizen who is interested in forest conservation in the State.

SYRACUSE WELCOMES NELSON BROWN

Nelson Courtlandt Brown has returned to his former work as head of the Department of Forest Utilization at the New York State College of Forestry at Syracuse.

Mr. Brown left the College in May, 1917 to accept an appointment as Lumber Trade Commissioner of the United States Department of Commerce and the National Lumber Manufacturers Association to investigate the effects of the war upon the lumber trade of Europe, the results of the destruction of the forests to maintain the fighting armies along the various fronts and the possible needs for American lumber after the war. In connection with this very important work Mr. Brown toured all the principal lumber producing sections of the United States and Canada, with the Lumber Commission, and spent two years in Europe. He was a great deal of the time along the active fighting fronts in France, Italy and the Balkans, and investigated forestry practice and the lumber industry in Great Britain, France, Belgium, Spain, Italy, Greece, Serbia and portions of Northern Africa.

Colonel W. B. Greeley, head of the Forestry regiments and Chief of the United States Forest Service, arranged to have Mr. Brown transferred from the United States Department of Commerce to the War Department, and while in this position as Civilian Engineer of the American Expeditionary Forces, he purchased in Spain lumber, railroad ties and other supplies for the United States Army.

As a result of his investigations, Mr. Brown has published two monographs through the United States Department of Commerce, "The Lumber Market and Reconstruction Requirements in Italy" and "The Lumber Market in Spain and Portugal." He recently issued a book entitled "Forest Products, Their Manufacture and Use" which has been adopted as a text book in many of the forestry schools and universities. Mr. Brown has also written a number of valuable articles for lumber trade journals, and popular and scientific magazines.

Since completing his work with the Government he has been actively engaged in the domestic and foreign lumber trade as a partner in the American Woods Export Association, 30 Church St., New York City and the American Woods Company, being also closely affiliated with the American Lumber Sales Company which took over the contract for the disposal of 135,000,000 feet of the surplus stock of the United States Shipping Board. Mr. Brown returned to Europe in 1919 and spent the winter of 1920 as consulting adviser to the Republic of Czechoslovakia on the management and exploitation of the Hapsburg Crown Forests which recently came into the hands of the new republic. He made

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a personal investigation of the forests throughout Czechoslovakia and studied forestry conditions in Poland, Russia, Austria and Hungary. Mr. Brown is one of the directors of the American Forestry Association.

PLANT TREES FOR BIRDS.

"Among the many considerations that enter into the planting of trees, shrubs and vines about the home, is the idea of growing plants that will attract birds", says Professor Alan F. Arnold of the New York State College of Forestry. "There is a possibility of some species of native birds disappearing altogether, through lack of plants for food and shelter. The list of trees, shrubs and vines attractive to birds includes a great many of our most ornamental plants. There is no more valuable evergreen tree for ornamental purposes, than the native Red Cedar; it also provides the best shelter and nesting sites for birds, while they find food in the berries and insects commonly found on the tree. The native Flowering Dogwood and the Chinese Flowering Crabapple (*Pyrus pulcherrima*) are two of the most beautiful flowering trees and particularly in favor with birds. The Gray-stemmed Dogwood, Monow's Honeysuckle, American Elder and Sheep Berry are most serviceable from both the bird and ornamental viewpoint. The Virginia Creeper, probably the most popular vine, furnishes nesting sites as well as bird food; it is recommended to draw the attention of the birds away from grapes, apples and peaches."

M. B. PRATT HONORED

California's progress along the lines of conservation and the laws enacted by the last session of the Legislature for the promotion of forestry within the State has received a distinct recognition by the election of Deputy State Forester M. B. Pratt as Vice President of the Association of State Foresters of the United States at its annual meeting recently held at Albany, New York.

State Forester Bazley of Massachusetts was elected President and Chapin Jones, State Forester of Virginia, was elected Secretary-Treasurer of the Association.

Mr. Pratt graduated from the Yale Forestry School in 1906 and has been actively engaged in Forestry since that date, most of his work having been done in California. He was Deputy Supervisor of the Tahoe National Forest for a considerable period and from there went to the University of California, where he was Professor of Forestry until his appointment as Deputy State Forester on February 1, 1918.

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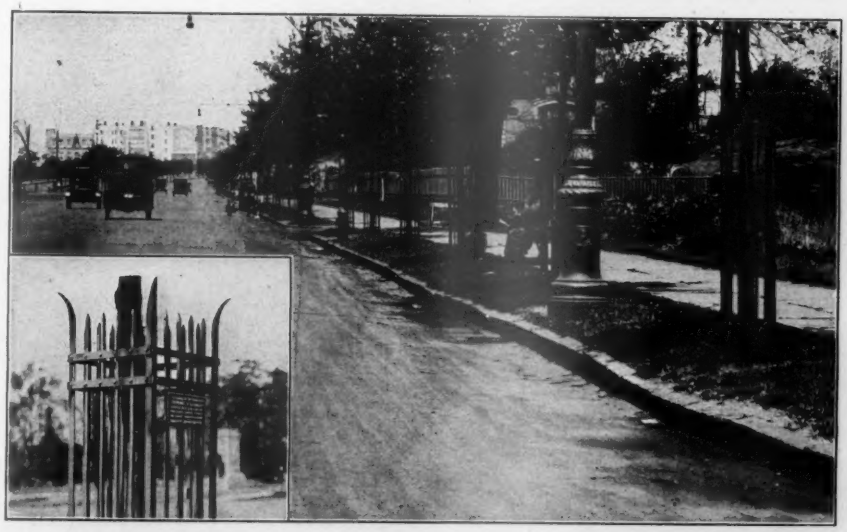

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EX-SERVICE MAN; age 30; married; two and one-half years in forestry college; experienced in city forestry, nursery work, tree surgery, dynamiting and in handling men; wishes position in city forestry or park department any where in northeastern United States. Now employed. Address Box 3025, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (10-12-21)

WINTER POSITION wanted with lumber company as time keeper or similar work. Graduate of high school and ranger course, 25 years old, good references from previous employers. Address Box 3030, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (10-12-21)

FORESTER—Graduate of Penn State, 28 years of age, desires work in Forestry or allied lines. Varied experience in Forestry and lumbering. Served with 10th Engineers and with Wood Supply Branch in France. Will consider any outdoor work with a future. Address Box 3035, care AMERICAN FORESTRY MAGAZINE, Washington, D. C. (10-12-21)

WANTED

FORESTERS, UNEMPLOYED OR EMPLOYED, having executive ability and posessing the gift to lead others, to write us. Great opportunity for those that qualify. State age, —reference—(2) if employed. School graduated from (years). Confidential. Rangers also answer this. Address Box 66-66, AMERICAN FORESTRY MAGAZINE, Washington, D. C.

CITY FORESTERS—The Oklahoma Forestry Association, in order to assist cities and towns in Oklahoma to procure men with technical training and practical experience in city forestry work desires names of qualified men. Please send name and address, giving age, training and experience to the Secretary, THE OKLAHOMA FORESTRY ASSOCIATION, Stillwater, Oklahoma.

C. W. WATSON JOINS IDAHO STAFF

In line with her policy to render most efficient service by increasing the facilities for instruction in proportion to the demands of an increasingly large enrollment the School of Forestry at the University of Idaho has secured the service of Clarence W. Watson, as a new Instructor in Forestry for the present school year. Mr. Watson received his degree of Bachelor of Philosophy from the Sheffield Scientific School of Yale University in 1916 and after an interruption of two years during the war completed his graduate work at the Yale School of Forestry for the degree of Master of Forestry in 1920. Mr. Watson served 16 months in France with the Engineers, during which time he was engaged primarily on engineering assignments. In 1920 Mr. Watson was awarded a scholarship from the American Scandinavan Scholarship Exchange and he has just returned from a year's study of forestry in Sweden. He will handle the courses in Silviculture and Grazing at the University of Idaho and under his competent leadership this department will be developed and maintained at the highest possible standard.

MONEY FROM FORESTS

Twenty-eight States have received checks totaling $619,993 from the United States Treasury as their share of the receipts from the National Forests for the fiscal year ending June 30. An additional $247,997 of the receipts has become available for road and trail construction by the Forest Service of the United States Department of Agriculture within the National Forests of these same States; making a grand total of $867,990.

The amounts are considerably smaller than for the previous fiscal year, when the total was $1,652,088. This is due largely to the concession made by Congress to stockmen, whereby they are allowed until December 1 to pay their grazing fees due last spring. This action was made necessary by the widespread depression in the live stock business. A small portion of the reduction is due also to a falling off in timber sale receipts of the forests due to business conditions.

Only States within which National Forests exist share in the receipts. By Act of Congress, 25 per cent of the funds derived from timber sales, grazing fees, special uses, etc., are returned to the States for roads and schools. The amount thus received is redistributed to counties in lieu of taxes, based on the area of National Forest land within their boundaries. In addition, 10 per cent of the forest receipts are spent within the counties by the Forest Service on road and trail construction and maintenance.